Vedic Mathematics

Indian Mathematics from Vedic Period until today is ‘Vedic Mathematics’

Ravi Kumar Iyer
Mob. +91 8076 4843 56

Vedic Mathematics

I am sorry I am not able to meet you Physically. But once the pandemic is over, let us meet and learn VM properly. Today is only a TRILER

I need your cooperation

If possible pl sit with your school going children above the age of 12. They pick up very quickly

I have conducted VM workshops in many leading universities in USA, Canada, Holland, Norway, Australia, New Zealand etc.

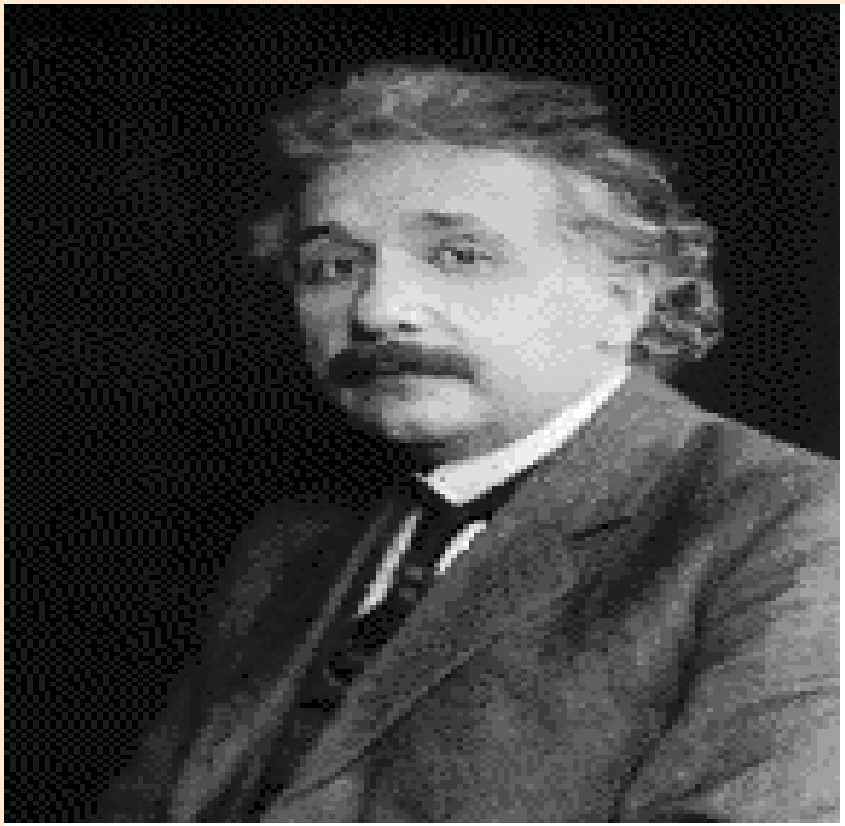
Also in Royal Society

My 5 Sessions on VM in Radio Sydney won maximum attendance award

ravisydney@yahoo.com,
www.hindugenius.blogspot.com

"You Tend to hear The Worst 5% of the Indian Story 95% of the Time"

Quotes on Indian Mathematics



Albert Einstein
Culver Pictures, Inc.

- We owe a lot to Indians, who taught us how to count, without which no worthwhile scientific discovery could have been made.

- **Albert Einstein**

Ancient Vedic Shloka over 5,000 years back

"Om purna mada purna midam
Purnaat purnam udachyate
Purnasya purnam adaaya
Purnam eva vasishyate
Om shanti shanti shantih"

(Isha Upanishad)

Guillaume de l'Hôpital
1661- 1704 France, Paris
INFINITY ÷÷ INFINITY = INFINITY

Which translates into:

"That is the whole, this is the Whole; from the Whole, the Whole arises; taking away the Whole from the Whole, the Whole remains"

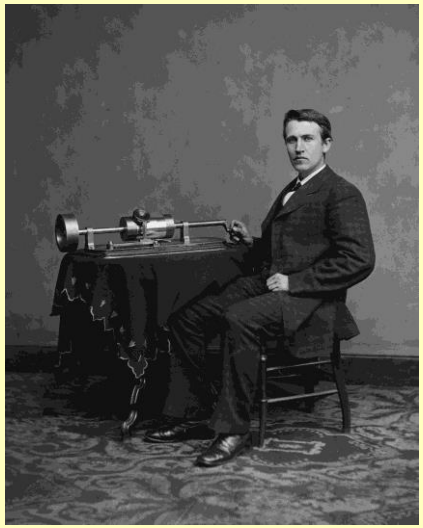
(Replace Whole by Infinity)

Great Mathematicians of Vedic Period

Indian Mathematics from Vedic Period until today is 'Vedic Mathematics'

How old is Vedic Civilization ??

How old is Vedic Civilization ??



Thomas Alva Edison (1847 – 1931)

Gramaphone 1877

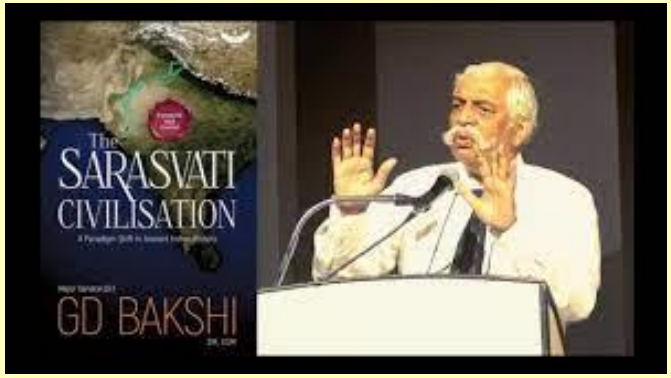
Max Müller (1823 – 1900)

अग्निमीळे पुरोहितं यज्ञस्य देवं रत्वीजम |
होतारं रत्नधातमम ||
aghnimīḷe purohitaṃ yajñasya devaṃ ṛtvījam |
hotāraṃ ratnadhātamam ||

I worship Agni who is the priest, the one who leads us from the front, who is the deity subject matter of a ritual, a yajna who is the one who makes the formal invocations in the yajna who is the source, storehouse and the bestower of all wealth, gems, precious stones etc

1 -1-1 of Rigvedam.

How old is Vedic Civilization ??
Saraswati Civilization 8,000 BC ? !



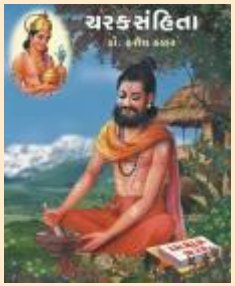
NADISTUTI hymn in the Rigveda (10.75)

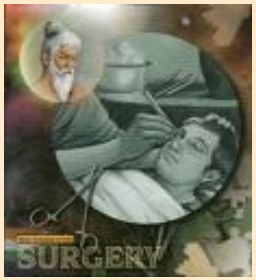
RV 7.95.1-2,

TANDYA BRAHMANA and the JAIMINIYA BRAHMANA, as well as the Mahabharata, mention that the Sarasvati DRIED UP IN A DESERT.

1ST Golden Age of Indian Science & Technology

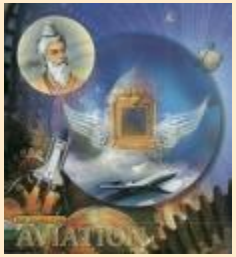
Scientists 3,000 Years before

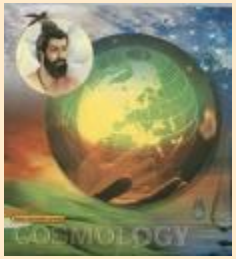



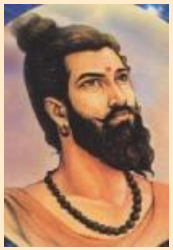


Dhanwantari, Charaka, Sushruta

Medical Science including Plastic Surgery, Nano Technology, Veterinary Science, Botany, Pharmacy,

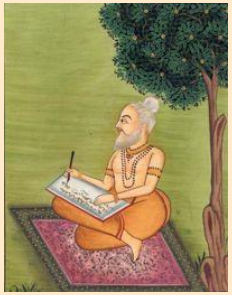
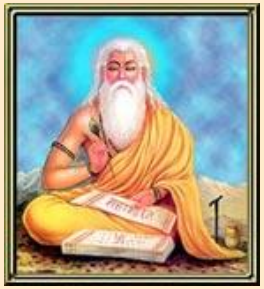






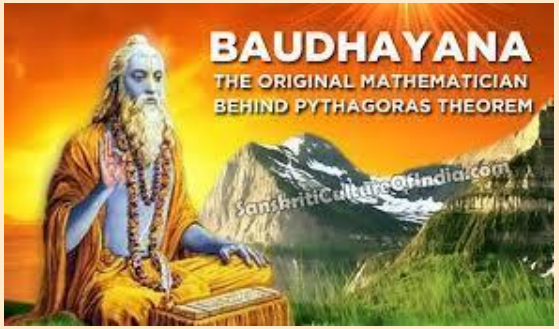
Rishi Bharadwaj, Kapil, Kanad

Vimana Shastra or Space Vehicles, Cosmology or Creation of Universe, Nuclear Physics & Chemistry


Sage Valmiki, Ved Vyas, Patanjali

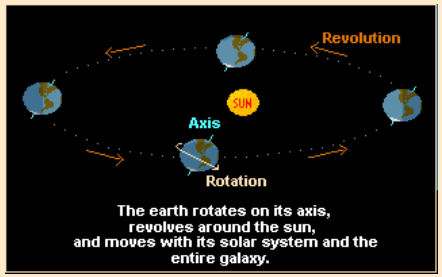
War Techniques, Missiles, War Techniques, Architecture, Artha Shastra Yoga, Meditation, Grammar, Ayurveda



Bhu Gol (Geography); Ja Gata (It Moves)

- Varaha (Boar, Pig) Avtar saves Earth
- Shape of Earth is ROUND
- West only after Apollo – XI (July 20, 1969)

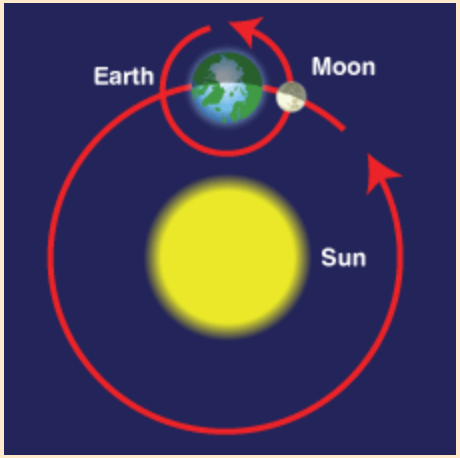
  West only after Apollo – XVII Earth Photos (Dec 6, 1972)



Earth Rotates on its own axis and revolves around the Sun 1543 Copernicus

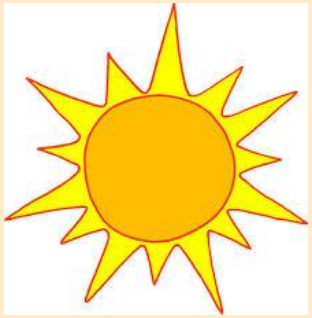
Ja Gata – That which moves NAVAGRAHA

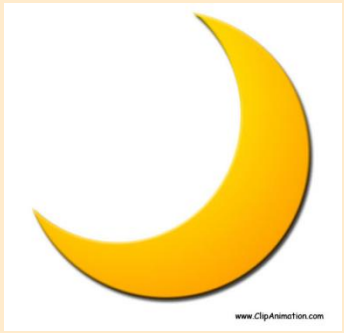
Jai JAGADISHA Hare



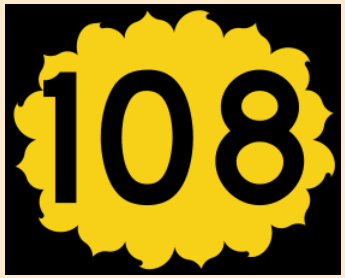
AMAVASYA Lord Krishna doing Tarpanam

Hindus Contribution to Calendar Science





- Nyayiru
- Thingal
- Sevvai
- GURU
- Shani
- Jyeshtha



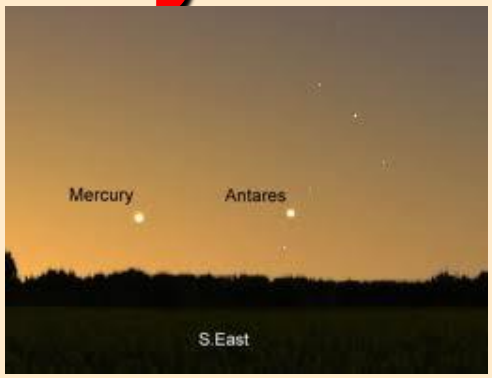
- 1st April Financial
- NEW YEAR

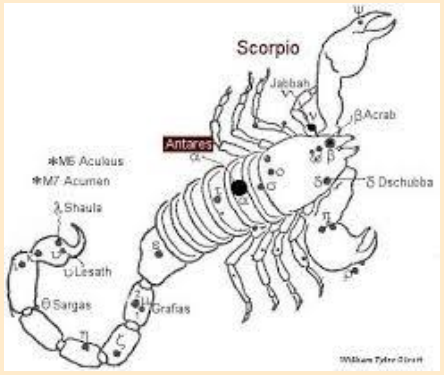
- Carl Sagan
- Cosmos
- Cosmology

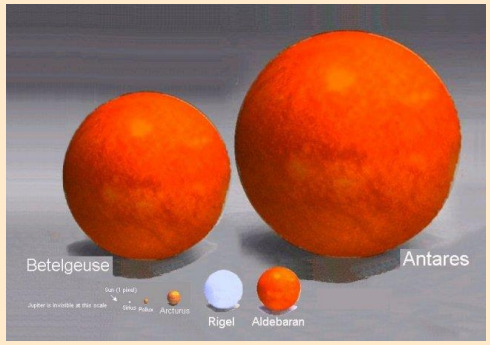
- March
- Sapta
- Ashta
- Nava

- Bhu-Golam,
- Ananta Koti Brahmanda m

Jyeshtha Nakshatra = Antares







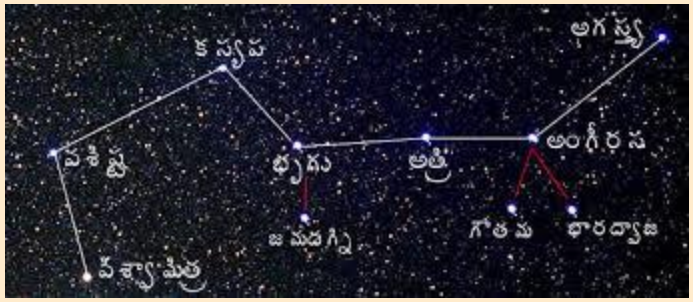
- **JYESTHA or Elder / Biggest Star**
  It is just a point in the sky

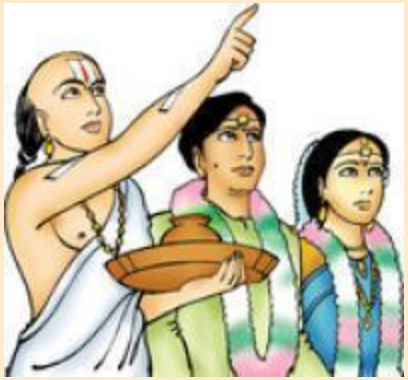
- **Antares or Alpha Scorpii**
  17th brightest star in the nighttime sky

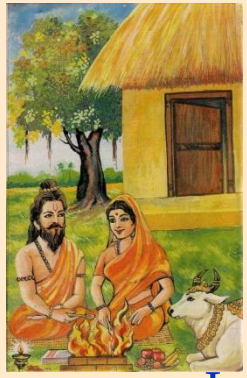
- **550 light years away**

- **Radius is 883 times that of Sun Most Massive star / BIGGEST Star**
  ~ 70 Crore times sun

Sapta Rishi = Ursa Major





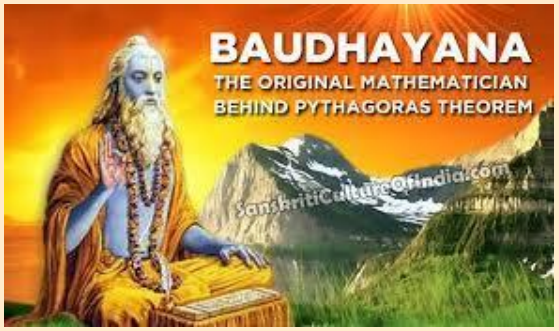


- The present, seventh Manvantara - the interval of Vaivasvata Manu
- Kashyapa, Atri, Vashishtha, Vishvamitra, Gautama, Jamadagni, Bharadvaja
- Vasishtha is accompanied by his wife, the faint companion star Arundhati (Alcor/80 Ursa Majoris).

Indian Name	Bayer Desig	Western Name
Kratu	α UMa	Dubhe
Pulaha	β UMa	Merak
Pulastya	γ UMa	Phecda
Atri	δ UMa	Megrez
Angiras	ε UMa	Alioth
Vasishtha	ζ UMa	Mizar
Bhrigu	η UMa	Alkaid

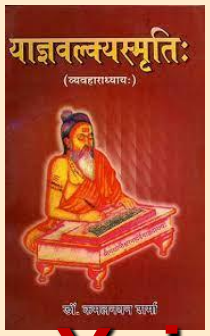
- In Hinduism, Ursa Major is known as Saptarshi, each of the stars representing one of the Saptarshis or Seven Sages viz. **Bhrigu, Atri, Angirasa, Vasishta, Pulastya, Pulalaha and Kratu**. The fact that the two front stars of the constellations point to the pole star is explained as the boon given to the boy sage Dhruva by Lord Vishnu.
- https://www.youtube.com/watch?v=_yNeuyaGO_E
- Khurshed Batliwala Technology of Spirituality

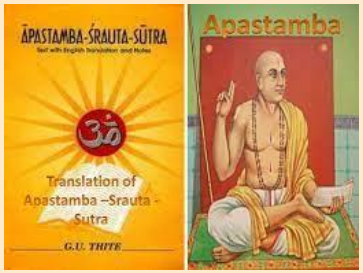
Mathematics in Vedic Period

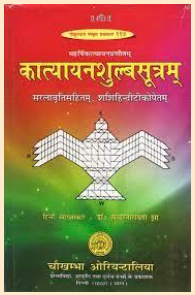


Grand Fathers of Computer Science

Panini Backus Noir Form







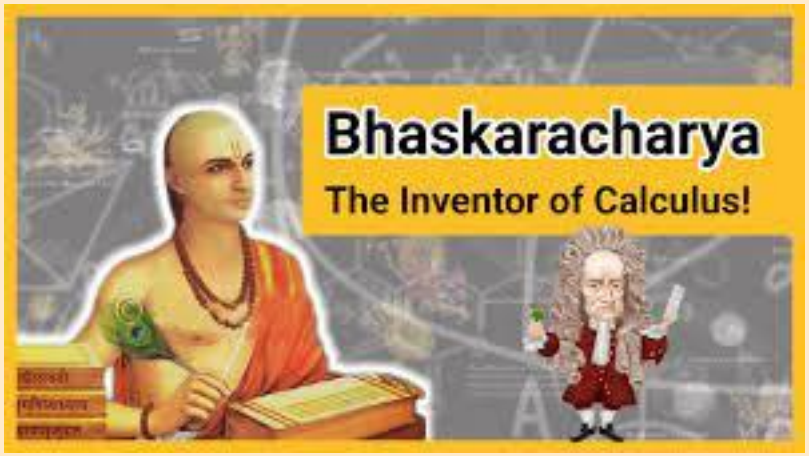
$\sqrt{2}$ = 1 + 1/3 + 1/3x4 - 1/3x4x34
= 577 / 408
= 1.414216

Yajyavalkya, Apastambh, Katyayan, Manava

Shulbha Sutras, Pythagoras Theorem, Triplets, Square Root of 2 Circling the Square

108 = Diameter of Sun Diameter of Earth
= Distance between earth and Sun diameter of Sun
= Distance between Moon and Earth Diameter of Moon

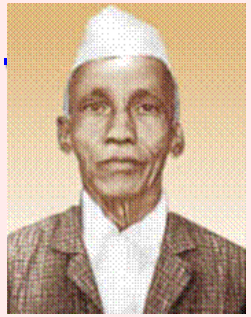
Mathematicians from Maharashtra



Dr Narendra Karmarkar Dr Sharadchandra Shrikhande. Dr Jayant Narlikar.

Bapudev Sastri

Dattatreya Kaprekar 1905 - 1984



HARSHAD NUMBERS (Joyous Numbers) 12, 18, 20, ..

DEMLO NUMBERS (1, 121, 12321, 1234321
= Sq of 1, 11, 111, 1111 etc)

KAPREKAR NUMBERS (45X45, 55X55, 99X99); 703, 5292,
45X45 = 20 25 & 20+25 = 45 55X55 = 30 25 & 30+25 =55
99X99 = 98 01 & 98 + 01 = 99;
703X703 = 494 209 & 494+209 = 703

DATTATREYA NUMBERS 7, 13, 35, 65 are Dattatreya Nos

$13^2 = 13X13 = 169 = 16 * 9 = 4^2 * 3^2$

$7^2 = 7X7 = 49 (2^2, 3^2)$, $19^2 = 361 = 36\text{-}1 = 6^2 * 1^2$

$35^2 = 1,225 = 1\text{-}225 = 1^2 * 15^2$ $57^2 = 324\text{-}9 = 18^2 * 3^2$,

$65^2 = 4,225 = 4\text{-}225 = 2^2 * 15^2$,

Dattatreya Kaprekar 1905 - 1984

Harshad Numbers
Joyous Numbers

Numbers divisible by the sum of their digits

The first 50 Harshad numbers with more than one digit in base 10 are:

10, 12, 18, 20, 21, 24, 27, 30, 36, 40, 42, 45, 48, 50, 54, 60, 63,
70, 72, 80, 81, 84, 90, 100, 102, 108, 110, 111, 112, 114, 117,
120, 126, 132, 133, 135, 140, 144, 150, 152, 153, 156, 162,
171, 180, 190, 192, 195, 198, 200.

Dattatreya Kaprekar 1905 - 1984

Demlo Numbers

Demlo is a Railway Station in India

numbers 1, 121, 12321, 1234321…, which are the squares of the repunits 1, 11, 111, 1111, ….

Dattatreya Kaprekar 1905 - 1984

Kaprekar Numbers

a positive integer with the property that if it is squared, then its representation can be partitioned into two positive integer parts whose sum is equal to the original number

$45 \times 45 = 20\ 25$ (20 + 25 = 45)

$55 \times 55 = 30\ 25$ (30 + 25 = 55)

$703^2 = 494\ 209$ (494 + 209 = 703)

$2728^2 = 744\ 1984$ (744 +1984)

$5292^2 = 28\ 005264$ (28 + 00 5264)

$857\ 143^2 =$ (734 694 + 122 449)

$99^2 = 98\ 01$ (98 + 01 = 99)

Dattatreya Kaprekar 1905 - 1984

Devlali Numbers (Self Nos)

Kaprekar lived in Devlali

Integers that cannot be generated by taking some other number and adding its own digits to it.

20 is a SELF No.

21 is NOT a Self No. 21 = (15 + 1 and 5 ie: 15 + 1 + 5 = 21

Dattatreya Kaprekar 1905 - 1984

Dattatreya Numbers

Numbers of the Form D = Wn A + B

Where D, A, B are Squares

13 x 13 = 169 = (16 & 9 ie 4^2 and 3^2)

13^2 = 4^2 & 3^2 = 10X 4^2 + 3^2

D = Wn A + B D, A & B are Square Numbers

In Decimal System D = 10A + B

(D, A, B are Squares)

49, 169, 361, 1-225, 324-9, 4-225,

Srinivas Ramanujam 1887 – 1920

'in the same league as legendary mathematicians such as Gauss, Euler, Cauchy, Newton and Archimedes'

English mathematician G.H. Hardy

Died at the age of 32.
Fellow of Royal Society,
Fellow of Trinity College, Cambridge

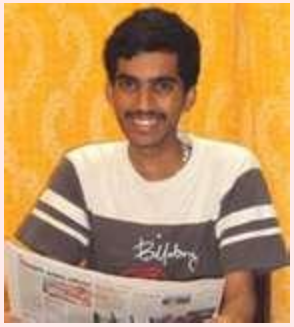
1729 Ramanujan Number = $10^3 + 9^3 = 12^3 + 1^3$

Mathematical analysis, Number Theory, Infinite Series and Continued Fractions.

3900 results

(mostly identities and equations) independently compiled results - both original and highly unconventional Ramanujan prime and the Ramanujan theta function,

Akshay Venkatesh 1981
Perth, Western Australia



International Physics Olympiad and International Mathematics Olympiad, at the age of 12

only Australian to win 2 Olympiads

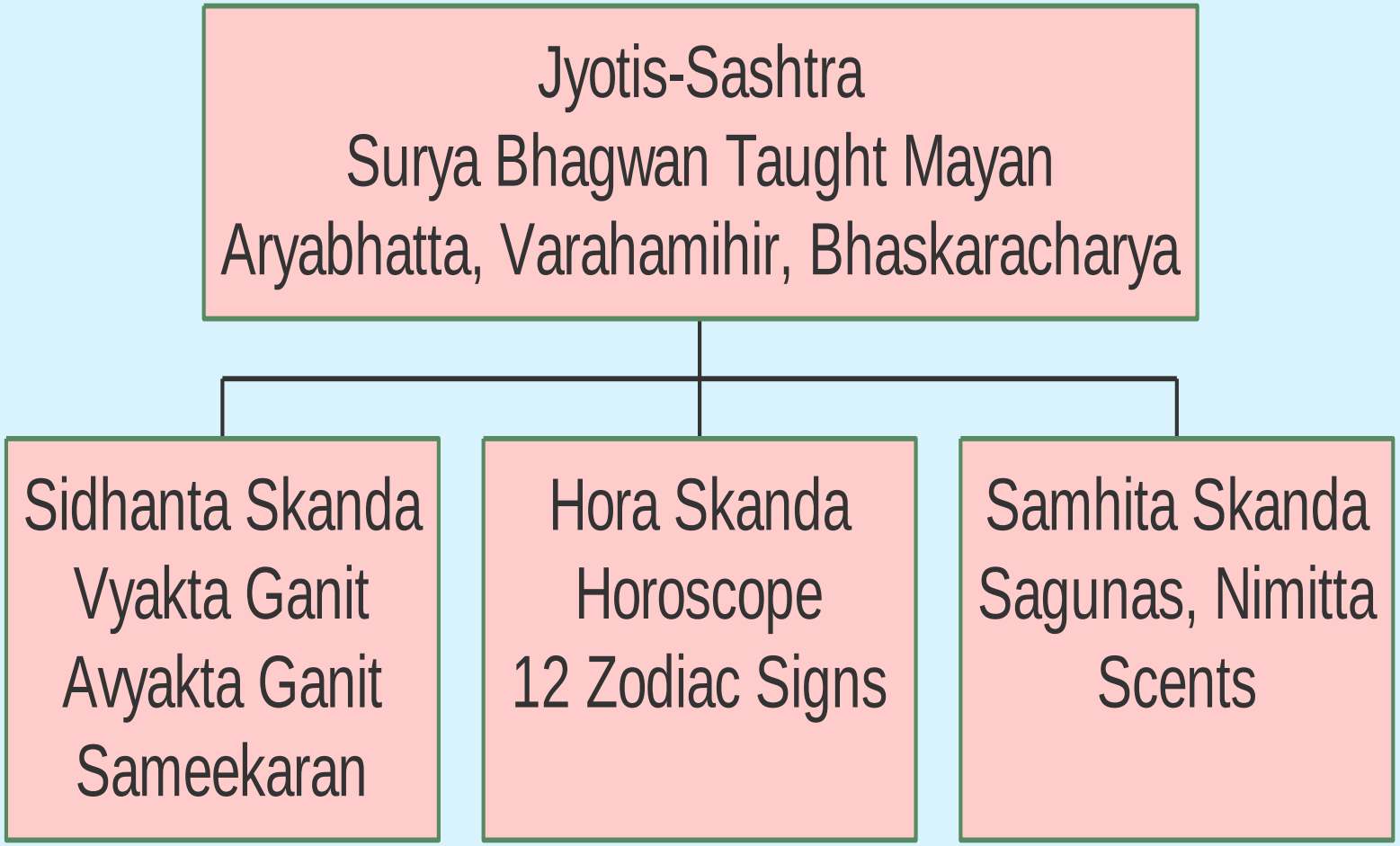
Stanford University Professor

counting, equi-distribution problems in auto-morphic forms and number theory, in particular representation theory, locally symmetric spaces and ergodic theory.

Ancient Books of Vedic Knowledge

4 Vedas	*6 Vedangas*	*4 Upa Vedas*	*4 Upangas*
• Rig	• Siksha (Phonetics) • Vyakarana (Grammer)	• Ayurveda (Charak Samhita)	• Mimamsa (Jaimini)
• Yajur	• Chhandas (Metres)	• Dhanurveda (Vishwamitra)	• Nyaya (Rishi Gautam)
• Sama	• Niruktam (Etymology – origin of words)	• Gandharva Veda (Bharat Muni)	• Puranas (Ved Vyas)
• Atharva	• Jyotisham (Astronomy-Eye of Ved) • Kalpam (ceremonies-limbs of Ved)	• Stapathya Veda & Artha Shastra (Bhrugu Ved Vyas)	• Dharma Shastras (Manu, Parashar, Yajnavalkya etc)

JYOTISH-SHASTRA



Vedic Physics
Measurement of Time

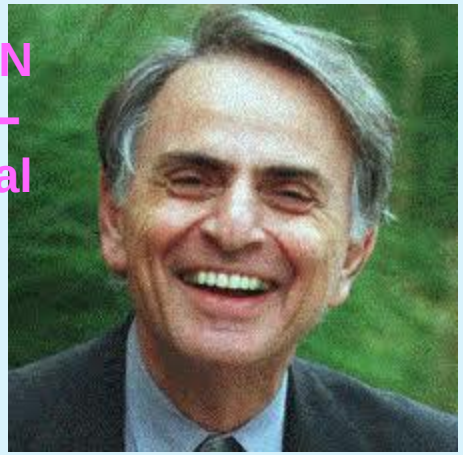
- **Vedic Units of Time**
- **(a) Smaller Units of Time**
- **TRUTI** = 33,750th fraction of a second is the smallest unit of time
- 100 Truti = 1 Tatpara
- 45 Tatpara = 1 Nimesha
- 30 Nimesha = 1 Prana = 4 secs
- 3 Nimesh = 1 Vipala = 0.4 seconds
- 60 Vipalas = 1 Pala = 24 seconds
- 60 Palas = 1 Ghatika = 24 Minutes
- 60 Ghatikas = 1 Divas = 1 day or 24 Hours

Vedic Physics
Measurement of Time

- **Vedic Units of Time**
- **(a) Larger Units of Time**
- 7 Divas = 1 Saptah = 1 week
- 15 Divas = 1 Paksha = 1 Fortnight
- 2 Paksha = 1 Maas = 1 Month
- 2 Maas = 1 Ritu = 1 Season
- 6 Maas = 1 Ayana (Uttarayan & Dakshinayan)
- 6 Ritu = 2 Ayanas = 12 Maas = 1 Varsha = 1 Year
  12 Years = 1 Kumbha
  60 Years = Sashtiyapta Purti
- 100 Years = 1 Shatabda
- 10 Shatabda = 1 Sahasrabda = 1 Millenium = 1,000 years

Vedic Physics
Measurement of Time

CARL SAGAN
Cosmos –
TV Serial



- **Vedic Units of Time**
- **(b) Higher Units of Time**

- **432 Sahasrabda = 1 Kali Yug or Yug = 432,000 years**
- **2 Yug = 1 Dwapar Yug = 864,000 years**
- **3 Yug = 1 Treta Yug = 1296,000 years**
- **4 Yug = 1 Satya Yug = 1728,000 years**
- **10 Yug = 1 Maha Yug = 4.32 Million Years**

- **1000 Maha Yug = 1 Kalpa = 4.32 Billion Years = Morning of Brahma**
- **2 Kalpa = 1 Day of Brahma = 2,000 Maha Yug = 8.64 Billion Years**
- **360 Days of Brahma = 1 Year of Brahma = 3110.4 Billion Years**
  = 3.1104 Trillion Years

1 Maha Kalpa or Brahma Ayu = 100 Years of Brahma
= 311.04 Trillion Years
= 3.1104 X 1014 Solar Years
= *311,040,000,000,000 solar years*.

- **Thus the Vedic Seers had thought of the smallest and the largest units of time namely,**
- **TRUTI , the smallest Unit of Time = *33,750th part of a Second***
- **Maha Kalpa or Brahma Ayu, = *311,040,000,000,000 solar years*,**
  the largest Unit of Time

Indian inventions

European Equivalents

Indian inventions

1. Bodhayan(BC 1700 / 800 BCE)
Diagonal square theorem

Foreigners` claims

Pythagoras theorem
(BC 540)

Professor H. G. Rawlinson writes:

" It is more likely that Pythagoras was influenced by India than by Egypt. Almost all the theories, religions, philosophical and mathematical taught by the Pythagoreans, were known in India in the sixth century B.C., and the Pythagoreans, like the Jains and the Buddhists, refrained from the destruction of life and eating meat and regarded certain vegetables such as beans as taboo" "It seems that the so-called Pythagorean theorem of the quadrature of the hypotenuse was already known to the Indians in the older Vedic times, and thus before Pythagoras (ibid). (Legacy of India 1937, p. 5).

Indian inventions

European Equivalents

Indian inventions

Foreigners` claims

2. **Varahamihir (488-587AD)**
Tri-Lostaka

B.Pascal (1623-1662 AD)
Pascal triangle.

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1

Chandas Shastra, **an Ancient Indian book on Sanskrit prosody written by Pingala between the** 5th and 2nd century BCE.

While Pingala's work only survives in fragments, the commentator Halayudha, around 975, used the triangle to explain obscure references to *Meru-prastaara*, the "Staircase of Mount Meru".

Indian inventions Foreigners` claims

Indian inventions

Foreigners` claims

3. Brahmagupta (628 AD)
$N x^2 + 1 = y^2$

John Pell (1610-1685)
Pell`s equation.

Pell's equations were studied as early as 1000 BC in India.
They were mainly interested in the equation

$$X^2 - 2Y^2 = 1$$

because of its connection to the square root of two. Indeed, if *x* and *y* are integers satisfying this equation, then *x* / *y* is an approximation of $\sqrt{2}$. For example, Baudhayana discovered that

$$x = 17, y = 12 \quad \& \quad x = 577, y = 408$$

are two solutions to the Pell's equation, and give very close approximations to the square root of two.

Indian inventions

European Equivalents

Indian inventions

European Equivalents

4.Virahank`s (600AD) series
0,1,1,2,3,5,8,13,21.....

Fibonacci series (1170-1250)

The Fibonacci sequence was well known in ancient India, where it was applied to the metrical sciences (prosody), long before it was known in Europe.

Developments have been attributed to Vedic Scholar Pingala (400 BC), Virahanka (6th century AD), Gopāla (c.1135 AD), and Hemachandra (c.1150 AD).

The motivation came from Sanskrit prosody, where long syllables have length 2 and short syllables have length 1. Any pattern of length *n* can be formed by adding a short syllable to a pattern of length *n* − 1, or a long syllable to a pattern of length *n* − 2; thus the prosodists showed that the number of patterns of length *n* is the sum of the two previous numbers in the sequence. Donald Knuth reviews this work in *The Art of Computer Programming*.

Indian inventions Foreigners` claims

5. Mahavira formula(850 AD) **Herigone`s formula(1634 AD)**
for combinations n Cr = (n)! / (r!) (n-r)! **(! stands for factorial)**

6. Bhaskaracharya (1114-1193) Rolle`s theorem(1652-1719)
Formula for relative difference (retrograde motion)

7. Madhav`s theorem (1340-1425) **Gregory Series(1638-1675)**
x = tan x / 1 – tan 3 x / 3 + tan 5 x / 5 - .....

8. Madhav`s series **(1340-1425)**
II (pie) = 1-1/3 + 1/5 - 1/7 +..... Leibnitz `s expansion (1646-1716)

9. Narayan Pandit (1356 AD) **Fermat`s result (1601-65)**
factorization method for divisiors of a number

10. Bhaskaracharya (1114-1193) Euler's division algorithm
method of finding greatest common divisor

11. Permeshwara`s (1360 AD)** **Huiler`s formula (1782AD)
Formula for finding circum-radius of a cyclic quadrilateral

Indian inventions	Foreigners` claims
12. Nilkanth Somyaji (1444-1545) Summations $\sum n$, $\sum n^2$ and $\sum n^3$	**Euler`s results (1707-1783)**
13 Nilkanth Somyaji (1444-1545) r sine rule a / sin A =b / sin B = c / sin C	Euler`s results
14. Brahmagupta (628 AD volumes of frustum of cone and of pyramid	**Kepler**
15 Jyeshtha Deo (1500 AD) formulae for sin(x+y) and cos(x+y) in the text `*Yuktibhasha*`	Euler
16 Jyeshtha Deo (1500 AD), Linear equations,	**Liebnitz (1646-1716)**
17 Jyeshtha Deo (1500 AD) volume and surface area of a sphere	Liebnitz, by method of integration
18. Shankar Variar (1500-60) Values of II/4, II/16 in series	**Gauss(1777-1855)**

MATHEMATICIAN TIME PERIOD

- **Baudhayana (1700 / 800 B.C.E. 1st to explain Pythagoras Theorem)**
- **Apastamba (1500 / 600 BCE)**
- **Katyayana (1100 / 200 BCE)**
  Umaswati (150 B.C.E.)

- Aryabhata (476-c. 550 C.E.)
  Varahamihira (c. 505-c. 558)
  Brahmagupta (c. 598-c. 670)
  Govindaswami (c. 800-850)
- Mahavira (Mahaviracharya) (850)

MATHEMATICIAN TIME PERIOD

- Pruthudakaswami (850)
- Sridhara (900)
- Manjula (930)
- Aryabhata II (950)
- Prashastidhara (958)
- Halayudha (975)
- Jayadeva (1000)

MATHEMATICIAN TIME PERIOD

- Sripathi (1039)
- Hemachandra Suri (b. 1089)
- Bhaskara (1114-c. 1185)
- Cangadeva (1205)
- Madhava of Sangamagramma (c. 1340-1425)
- Narayama Pandit (1350)
- Paramesvara (1360-1455)
- Nilakantha Somayaji (1455-1555)

MATHEMATICIAN TIME PERIOD

- Sankara Variar (c. 1500-1560) Narayana (c. 1500-1575)
- Jyesthadeva (550)
- Acyuta Pisarati (c. 1550-1621) Putumana Somayaji (c. 1660-1740) Jaganath Pandit (1700)
- Sankara Varman (1800)

Vedic Additions

3 9	30 + 9	I	3 4 5	300 + 40 + 5
4 6	40 + 6	I	6 7 8	600 + 70 + 8
-----	-------	I	-----	----------
8 5	70+15 = 85	I	10 23	900 + 110 + 13
		I		900 + 120 + 3
		I		= 1 0 2 3

==========

3 4 6	300 + 40 + 6	
9 8 7	900 + 80 + 7	
1 2 3	100 + 20 + 3	
8 0 5	800 + 00 + 5	
-----	----------	
22 61	2100 + 140 + 21	
	22 6 1	

Vedic Additions

			Hundreds	Tens	Units
	0 3 4 6		300	40	6
+	0 9 8 7		900	80	7
+	0 1 2 3		100	20	3
+	0 8 0 5		800	00	5
TOTAL	22 6 1	Total	2100	140	21
		=	2100	160	1
			2200	60	1
TOTAL			22	6	1

Vedic Subtractions

MITRAS are

1 and 9

2 and 8

3 and 7

4 and 6

5 and 5

Compare the digits in the First Line and Second Line.
* If any digit in the SECOND LINE is bigger (than the digit in the FIRST LINE), then we find its MITRA and add it to the digit in FIRST LINE

- Add 1 to the left of the Mitra number
- Add Green Numbers and Subtract PINK numbers

		To Subtract **24 from 53**			
First Line	5 3	4 (of 24) is bigger than 3 (of 53)		5 3	5 3
Second Line	- 2 4	MITRA of 4 is 6 6 + 3 = 9		- A 6	- 3 + 6
		Add 1 to 2 (of 24) =3			= 2 9
		5 – 3 = 2			

Vedic Subtractions

MITRAS are

1 and 9

2 and 8

3 and 7

4 and 6

5 and 5

Compare the digits in the First Line and Second Line.
* If any digit in the SECOND LINE is bigger (than the digit in the FIRST LINE), then we find its MITRA and add it to the digit in FIRST LINE

- Add 1 to the left of the Mitra number
- Add Green Numbers and Subtract PINK numbers

		To Subtract 274 from 523			
First Line	5 2 3	4 (of 274) is bigger than 3 (of 573)		5 2 3	5 2 3 ~~2. 7 4~~
Second Line	-2 7 4	MITRA of 4 is 6 Add 1 to 7 = 8 Mitra of 8 = 2		- 2 8 6	- 3 +2+6
Answer	2 4 9			Answer	=2 4 9
		Add 1 to 2 (of 274) =3			
		5 – 3 = 2			

Vedic Subtractions

		To Subtract 256 524 from 975 708
First Line	9 7 5 7 0 8	Bigger Nos 6 and 2 Mitras 4 and 8 Add 1 to Nos on Left
Second Line	- 2 5 6 5 2 4	Add Green Nos Subtract Pink Nos
Redesigned 2nd Line	9 7 5 7 0 8 ~~2 5 6 5 2 4~~ 2 6 4 6 8 4	
Answer	7 1 9 1 8 4	

Multiplying by 5

- **Case 1:** **All Even Digits**
- **Case 2:** **Odd and Even Digits {last Digit is even}**
- **Case 3:** **Odd and Even Digits {last Digit is odd, including all odd digits}**

Multiplying by 5 – All Even Digits

- Step 1: Divide by 2
- Step 2: Add a Zero

- Example: 5 x 4
- Step 1: Divide 4 by 2 = 2
- Step 2: Add Zero = 20

- Example: 5 x 12 = 6 / 0 = 60

Multiplying by 5 – All Even Digits

- Example: 5 X 2 4 6
- Step 1: (Divide 246 by 2) = 1 2 3
- Step 2: (Add Zero) 0
- Answer is 1 2 3 0

- Solve:
- 5 X 2 8 6 = 1430
- 5 X 4 6 4 8 4 4 = 2324220
- 5 X 2 0 0 4 6 8 2 4
- 5 X 8 0 6 4 0 6 8 2
  4 0 3 2 0 3 4 1 0

- Solve:
- 5 X 4 8 2 0 = 24100
- 5 X 2 4 8 2 4
- 5 X 4 8 0 0 0 6 6
- 5 X 6 2 2 2 4 8 0
  3 3 3 3 2 4 0 0

Multiplying by 5 –Even and Odd Digits (Last Digit – Even)

- Example: 5 X 2 5 6
- Step 1 : Put a dot below all odd numbers
- Step 2 : Subtract one from all odd Digits to make them EVEN and
  write this Even Digit above the Odd Digit
- Step 3 : Carry Forward this one to the Digit on the Right of the Odd Digit
- Step 4 : Divide each Digit by 2 and Add Zero
- 5 X 2 5 6 = 2 – 4 – 16* = 1280

Multiplying by 5 –Even and Odd Digits (Last Digit – Even)

- Example: 5 X 2 3 6 9 4
- Step 1 : Put a dot below all odd numbers
- 2 3. 6 9. 4
- Step 2 : Subtract one from all odd Digits to make them EVEN and write this Even Digit above the Odd Digit
- 2 ^{2}3. 6 ^{8}9. 4

Multiplying by 5 –Even and Odd Digits (Last Digit – Even)

- 5 X 2 3 6 9 4
- Step 3 : Carry Forward this one to the Digit on the Right of the Odd Digit
- $2\ {}^{2}3_{.}\ {}^{1}6\ {}^{8}9_{.}\ {}^{1}4 = 2\text{-}2\text{-}16\text{-}8\text{-}14^{*}$
- Step 4 : Divide each Digit by 2 and Add Zero
- 1 1 8 4 7 0 Answer

Multiplying by 5 –Even and Odd Digits (Last Digit – Even)

- Solve
- 5 X 2 3 4 = 2-2-14 x5
  = 1170
- 5 X 2 0 3 0 4 = 2-0-2-10-4x5
  = 1 0 1, 5 2 0
- 5 X 2 0 0 3 0 0 4 = 2-0-0-2-10-0-4 = 10,015,020
- 5 X 4 ,3 5 6 ,7 7 8
  = 4-2-14-16-6-16-18x5
  = 2 1, 7 8 3, 8 9 0
- 5 X 1 2 ,3 4 5 ,6 7 8 = 61, 728, 390

Multiplying by 5 –All Odd Digits

- Example : 3 5 7
- Step 1 : Subtract one from all Odd Digits and make them Even
- Step 2 : Carry forward this one to the Digit on Right side
- Step 3 : Divide by 2 and add "5"

Multiplying by 5 –All Odd Digits

- Example : 3 5 7 x5
- Step 1 : Subtract one from all Odd Digits and make them Even
- 2 4 6 *
- Step 2 : Carry forward this one to the Digit on Right side
- 2 $_{1}$4 $_{1}$6 *
- Step 3 : Divide by 2 and add "5"
- 1 7 8 5 Answer

Multiplying by 5 –All Odd Digits

- **Solve**
- **5 X 3 5 7 9 = 2-14-16-18-* = 1 7, 8 9 5**
- **5 X 9 7 5 3 = 8-16-14-12-* = 4 8, 7 6 5**
- **5 X 1 3 0 7 9 = 12-10-6-18-*= 6 5, 3 9 5**
- **5 X 3 0 5 5 7 7 = 2-10-4-14-16-16-***
  = 1 5 2 7 8 8 5
  = 1,527,885
- **5 X 999 777 555**
  = 8-18-18 – 16-16-16 – 14-14-14-*
  = 4 9 9 8 8 8. 7 7 7 5
- **5 X 303 507 7009**

Multiplying by 5 – Any Number

- Solve
- 5 X 2 3 5 8
- 5 X 1 2 3 0 5 6
- 5 X 2 3 4 5 6 7 8 9
- 5 X 1 2 3 4 5 6 7 8 9
- 5 X 9 8 7 6 5 4 3 2 1

To Multiply by 11

- **Clue: Add adjacent numbers**
- **Step 1: write the the first and last digit as they are**
- **Step 2: Add two adjacent digits from the right and fill the gaps**
- **Step 3: Carry forward 1 if need be to the left**

To Multiply by 11 – No Carry Forward

- **Example: 11 X 24**
- **Step 1: write the the first and last digits as they are**
- **2 N 4**
- **Step 2: Add two adjacent digits from the right and fill the gaps**
- **2 6 4 (2 + 4 = 6)**

To Multiply by 11

- **Example: 11 X 17**
- **Step 1: write the the first and last digits as they are**
- **1 N 7**
- **Step 2: Add two adjacent digits from the right and fill the gaps**
- **1 8 7 (1 + 7 = 8)**

To Multiply by 11

- Solve: (answers are in BLUE

- 11 x 22 = 242 11 x 33 = 363
- 11 x 27 = 297 11 x 36 = 396
- 11 x 44 = 484 11 x 54 = 594
- 11 x 62 = 682 11 x 72 = 792
- 11 x 81 = 891 11 x 71 = 781

To Multiply by 11 – Carry Forward

- **Example:11 X 38**
- **Here 3 + 8 = 11. Hence Carry forward**
- **Step 1: write the the first and last digits as they are**
- **3 N 8**
- **Step 2: Add two adjacent digits from the right and fill the gaps**
- **4 1 8 (3 + 8 = 11)**

To Multiply by 11 – Carry Forward

- Solve: Answers are in BLUE

- 11 x 29 = 319 11 x 39 = 439
- 11 x 48 = 528 11 x 68 = 748
- 11 x 99 = 1089 11 x 88 = 968
- 11 x 76 = 836 11 x 67 = 737
- 11 x 85 = 935 11 x 58 = 638

To Multiply by 11 – 3 or more Digits

- **Example: 11 X 2 3 4**
- **Step 1: write the the first and last digits as they are**
- **2 N M 4**
- **Step 2: Add two adjacent digits from the right and fill the gaps**
- **2/ (2 + 3)/ (3 + 4)/ 4**
  = 2 5 7 4

To Multiply by 11 – 3 or more Digits

- **Example: 11 X 2 6 1 3 4**
- **Step 1: write the the first and last digits as they are**
- **2 N M P Q 4**
- **Step 2: Add two adjacent digits from the right and fill the gaps**
- **2/(2+6)/ (6+1)/ (1+3)/ (3+4)/ 4**
- **2 8 7 4 7 4**

To Multiply by 11 – 3 or more Digits with Carry Forward

- **Example: 11 X 2 8 1 9 4**

- **Step 1: write the the first and last digits as they are**

- **2 N M P Q 4**

- **Step 2: Add two adjacent digits from the right and fill the gaps**

2/ (2+8)/ (8+1)/ (1+9)/ (9+4)/ 4
2 / 10/ 9 / 10/ 13/ 4

- ***3 1 0 1 3 4***

To Multiply by 11 – Carry Forward

- **Solve: Answers are in BLUE**

- **11 x 2709 = 29,799**
  11 x 3509 = 38,599
- **11 x 45318 11 x 62815**
- **11 x 8272 = 8/10/992 = 90,992**
- **11 x 9292 = 9/11/11/11/2**
  = 102,212
- **11 x 72635 11 x 1234567**
- **11 x 987654 11 x 9080706**

To Divide 1 by 19, 29, 39, 49, …99

Sutra is EKADHIKENA (One More)

$1 \div 19 = 0.05263\ 1578\ 94736\ 8421$

$1 \div 29 = 0.0344\ 8275\ 862\ 068$
$9655\ 1724\ 137\ 931$

Ekadhik or One More or Add One

For dividing by 19 the multiplier is 2
For dividing by 29 the multiplier is 3
For dividing by 59 the multiplier is 6
For dividing by 99 the multiplier is 10

*** When dividing by 19, the BIGGEST REMINDER is 18**
(19 or 20 cannot be the reminders)

To Divide 1 by 19, 29, 39, 49, …99

COMPLIMENTS of 9:

0&9, 1&8, 2&7, 3&6, 4&5

$1 \div 19 = 0.05263\ 1578\ 94736\ 8421$

$1 \div 19 = 0.\ 052\ 631\ 578$
$947\ 368\ 421$

(There is a pattern)

(Complement of 9)

$1 \div 19 = 0.\ 052\ 631\ 578$
$947\ 368\ 421$

(Pl Remember this)

$1 \div 29 = 0.0344\ 8275\ 862\ 068$
$9655\ 1724\ 137\ 931$

$1 \div 29 = 0.0344\ 8275\ 862\ 068$
$9655\ 1724\ 137\ 931$

Vedic Division: Divide 1 by 19,

1 Divided by 19, (VM says Multiply by 2)

Vedic Multiplication VM of 1 or 2 digits by 2:

VM of	16	is	6x2 +1	=	13
VM of	13	is	3x2 +1	=	7
VM of	7	is	7x2+0	=	14
VM of	14	is	4x2 +1	=	9
VM of	9	is	9x2	=	18
VM of	18	is	8x2 +1	=	17
VM of	17	is	7x2 +1	=	15
VM of	15	is	5X2 +1	=	11
VM of	11	is	1x2 +1	=	3
VM of	3	is	3x2	=	6
VM of	6	is	6x2	=	12

A. 1 Divided by 19, (VM says Multiply by 2)

B. 1 ÷ 20 = 0.05

Hence 1 ÷ 19 should be close to 0.05 (& slightly bigger)

C. Write the answer from Right to Left by continuously multiplying by 2 starting with 1.

D. Vedic Multiplication of 1 or 2 digits by 2

E. 1 ÷ 19 =

0.05 $_1$2 6 3 $_1$1 $_1$5 $_1$7 $_1$8 9 $_1$4 7 $_1$3 $_1$6 **8-4-2-1**

Multiply by 2
1
1X2 = 2
2X2 = 4
4X2 = 8
8X2 = 16 = $_1$6

Vedic Multiplication by 2
16X2 = $_1$6X2 = 12+1 = 13 = $_1$3
$_1$3x2 = 3X2 +1 = 7
7X2 = 14 = $_1$4
$_1$4X2 = 4x2 +1 = 9

Vedic Multiplication by 2
9X2 = 18 = $_1$8
$_1$8x2 = 8x2 +1 = 17 = $_1$7
$_1$7x2 = 7x2 +1 = 15 = $_1$5
$_1$5x2 = 5x2 +1 = 11 = $_1$1
$_1$1x2 = 1x2 +1 = 3

A. 1 Divided by 19, (VM says Multiply by 2)

E. $1 \div 19 =$

$0.05\ {}_{1}2\ \ 6\ 3\ {}_{1}1\ {}_{1}5\ {}_{1}7\ {}_{1}8\ 9\ {}_{1}4\ \ 7\ {}_{1}3\ {}_{1}6$ 8-4-2-1

F. 0. 0 5 2 6 3 1 5 7 $_1$8

9 $_1$4 7 $_1$3 $_1$6 8- 4- 2- 1

G. $1 \div 19 = 0.052\ 631\ 578\ 947\ 368\ 421$

Multiply by 2

1

1X2 = 2

2X2 = 4

4X2 = 8

8X2 = 16 = $_1$6

Vedic Multiplication by 2

16X2 = $_1$6X2 = 12+1 = 13 = $_1$3

$_1$3x2 = 3X2 +1 = 7

7X2 = 14 = $_1$4

$_1$4X2 = 4x2 +1 = 9

Vedic Multiplication by 2

9X2 = 18 = $_1$8

$_1$8x2 = 8x2 +1 = 17 = $_1$7

$_1$7x2 = 7x2 +1 = 15 = $_1$5

$_1$5x2 = 5x2 +1 = 11 = $_1$1

$_1$1x2 = 1x2 +1 = 3

Square of Numbers ending in 5

Ekadikena Purvena (One More than Previous)

To Find $(15)^2$, $(25)^2$, $(35)^2$, ... $(95)^2$, $(105)^2$, $(195)^2$, $(995)^2$,

EKADHIKENA or One More or Add 1

In case of	25	Add 1 gives	2 x 3	= 6
In case of	35	Add 1 gives	3 x 4	= 12
In case of	45	Add 1 gives	4 x 5	= 20
In case of	75	Add 1 gives	7 x 8	= 56
In case of	95	Add 1 gives	9 x 10	= 90
In case of	105	Add 1 gives	10 x 11	=110
In case of	195	Add 1 gives	19 x 20	= 380
In case of	995	Add 1 gives	99 x 100	= 9900

Square of Numbers ending in 5

Ekadikena Purvena (One More than Previous)

To Find Squares of 15, 25, 35, … 95, 105, 195, 995,

$(25)^2$ = 6 25 (2x3 =6)
(5 x 5 = 25)

$(35)^2$ = 12 25 (3x4 =12 & 5x5=25)

$(85)^2$ = 72 25 (8x9 =72)

$(105)^2$ = 110 25 (10x11=110)

$(195)^2$ = 380 25 (19x20 = 380)

$(995)^2$ = 9900 25 (99x100 = 9900)

Special Multiplications

Ekadikena Purvena (One More than Previous)

SPECIAL CASES 2 conditions

(a) Units add to 10 & (b) Tens are same

23 x27 = 6 21 (2x3; 3x7) (3+7=10)

192 x 198 = 380 16 (19x20; 2x8)

(19 is common & 2+8 = 10)

23 x 26 is not possible because units 3+6=9

23 x 37 is not possible because TENS are 2 and 3

Find: 44x46=? (2024) 91x99 = (90 09) how !!

993x997 =? (9900 21) 84x86= ? (72 24)

Multiple Digits entirely of 9

Eka Nyunena Purvena

(One Less than Previous)

Step 1: Minus 1

Step 2: Complement from 9

COMPLIMENTS of 9:

0&9, 1&8, 2&7, 3&6, 4&5

Find 49 X 99 =

Step 1: Subtract 1 from 49 = 48

Step 2: Take complement of 4 & 8 = 51

Hence 49 X 99 = 48 51

==========

76x99 = 75 24; 123x999 = 122 877

Multiple Digits entirely of 9

Eka Nyunena Purvena

(One Less than Previous)

49 X 99 = 48 51

777 x 999 = 776 223

120 357 x 999 999 = 120 356 – 879 643

~~879 643~~

77 x 999 = 077 x 999 = 078 - 921

777 x 99 = (776 99 – 7 76) = 76 9 23

1234 x9 = (1233 9 – 123 3) = 111 06

1234 x99 = (1233 99 – 1233) = 122,166

1234 x999 = (1233 999 – 1233) = 1232,766

(Subtract 1; adjust 99s on Rt side; subtract)

General Multiplication

Urdhva Tiryak

(Vertical & Cross-wise)

12 x 13 = 1x1 / 1x2 +1x3/ 2x3
= 1 / 2+3 / 6 = 156

37 x 42 = 12 / 28 + 6 / 14
= 12 / 34 /14 = 15 5 4

1021 x 2103 = 2/ 1/ 4/ 7/ 1/ 6/3
= 2147163

Tatitreeya Samhita 7-2-20-1

in 100 BCE

- 1 Ekam
- 10 Dasham
- 100 Shatam
- 10^3 Sahasram
- 10^5 Lakshaha
- 10^7 Kotihi
- 10^9 Ayutam
- 10^{11} Niyutam
- 10^{13} Kankaram
- 10^{15} Vivaram
- 10^{17} Parardhaha
- 10^{19} Nivaahaha
- 10^{21} Utsangaha
- 10^{23} Bahulam
- 10^{25} Naagbaalaha
- 10^{27} Titilambham
- 10^{29} Vyavasthaana
- Pragnaptihi
- 10^{31} Hetuheelam
- 10^{33} Karahuhu

Tatitreeya Samhita 7-2-20-1

in 100 BCE

- 10^{35} Hetvindreeyam
- 10^{37} Samaapta lambhaha
- 10^{39} Gananaagatihi
- 10^{41} Niravadyam
- 10^{43} Mudraabaalam
- 10^{45} Sarvabaalam
- 10^{47} Vishamagnagatihi
- 10^{49} Sarvagnaha
- 10^{51} Vibhtangamaa
- 10^{53} Tallaakshanam

- In Anuyogdwaar Sutra
- 100 BCE one numeral is raised as high as 10^{140}

- The highest prefix used for raising 10 to a power in **Today's Maths** is D for **10^{30}**

Vedic Maths Applied to Accountancy

- **Vedic Maths and Short Cuts as applied to Accountancy**
- https://www.youtube.com/watch?v=m9pgirOlXdE
-
- Accountancy applies a lot of mathematics. When we apply Vedic Mathematics to accountancy, calculations become simple and time saving. Thus
- Accountancy + Vedic Mathematics
  = **MATHEMAGICS** of Accountancy.

- **Technique 1: Dealing with Fractions and Percentages**

- Case 1: Solutions of Problems dealing with Fractions
- Ans = $\frac{\text{Fraction in Question}}{\text{Fraction Known}}$ X Value Given

Vedic Maths Applied to Accountancy

- Case 1: Solutions of Problems dealing with Fractions
- Ans = $\frac{\text{Fraction in Question}}{\text{Fraction Known}}$ X Value Given
- Example 1:

  If ½ of my pocket money is Rs 500/- what is ¾ of my pocket money.
- Here Fraction in Question is ¾; Fraction Known is ½
- Value Given for the known Fraction is Rs 500/-
- Hence Ans = { ¾ / ½} X 500
  = (3x2)/(4x1) X 500
  = (3/2) X 500 = 3X250
  = Rs 750/-

Vedic Maths Applied to Accountancy

- Case 2: Solutions of Problems dealing with Percentage
- Ans = $\frac{\%\text{ to Know}}{\%\text{ Known}}$ X Value Given

- Example 2: If 50% of my pocket money is Rs 500/- what is 75% of my pocket money.

- Here % to KNOW is 75% % Known is 50%
- Value Given for the known % is Rs 500/-

- Hence, Ans = (75/50) X 500
  = Rs 750/-

Vedic Maths Applied to Accountancy

- Example 3: I sold goods for Rs 50,000 at 25% profit on cost. What is the profit?

- Let 100x be the cost price. The Profit will be 25x and sale price will be 125x.

- Here value to KNOW is Profit which is 25%

- % Known is Sale Price = 125%. Sale Price value is Rs 50,000/-

- $$\text{Ans} = \frac{\%\text{ to Know}}{\%\text{ Known}} \times \text{Value Given}$$

- $$\text{Ans} = \text{Profit} = \frac{25\%}{125\%} \times 50{,}000 = \text{Rs } 10{,}000/-$$

- Ans: = Rs 10,000/-

Vedic Maths Applied to Accountancy

- Example 4: What is cost in the above example?

- Here we want to find the cost price which is 100%

- $$\text{Ans} = \frac{\%\text{ to Know}}{\%\text{ Known}} \times \text{Value Given}$$

- $$\text{Ans} = \text{Cost Price} = \frac{100\%}{125\%} \times 50{,}000 = \text{Rs } 40{,}000/-$$

- Ans = Rs 40,000/-

Vedic Maths Applied to Accountancy

- Example 5: My father saves Rs 50,000 per month.
- He spends 20 % on Rent
- 25 % on Household
- 20 % on Education
- 10 % on Sundries
- What is his total expense, What is his total income
  what is his expense on Rent, Household, Education and Sundries.

- Solution:
- To find his Total Expense
- His total expenses = 20% + 25% + 20% + 10% = 75%
- Hence his Savings = 100 – 75 = 25% = Rs 50,000/-
- Ans = His total Expense = $\frac{75\%}{25\%}$ x 50,000 = Rs 150,000/-
-

Vedic Maths Applied to Accountancy

- Solution:
- His total Income = $\frac{100\%}{25\%}$ X 50,000 = Rs 200,000/-
- His Expense on Rent = $\frac{20\%}{25\%}$ X 50,000 = Rs 40,000/-
- His expense on House Hold = 25% = Rs 50,000/-

- His expenses on Education = 20% = Rs 40,000/-
- His expenses on Sundries = 10% = Rs 20,000/-

Vedic Maths Applied to Accountancy

- Solution:
- To find his Total Expense
- His total expenses = 20% + 25% + 20% + 10% = 75%
- Hence his Savings = 100 – 75 = 25% = Rs 50,000/-
- Ans = His total Expense = $\frac{75\%}{25\%}$ x 50,000 = Rs 150,000/-
- His total Income = $\frac{100\%}{25\%}$ X 50,000 = Rs 200,000/-
- His Expense on Rent = $\frac{20\%}{25\%}$ X 50,000 = Rs 40,000/-
- His expense on House Hold = 25% = Rs 50,000/-
- His expenses on Education = 20% = Rs 40,000/-
- His expenses on Sundries = 10% = Rs

Vedic Maths Applied to Accountancy

- SHORT CUT TECHNIQUES
- Technique 2: To find Profit when CP or SP is given
- The Factors are Nr / (Dr+Nr) when Sale Price is Known
- Nr / (Dr-Nr) when cost price is Known
- Nr = Numerator Dr = Denominator

- Example 6: Sale of Goods is Rs 400/- at a Profit of 25% on Cost. What is the Profit.

- Answer: Profit is 25% = ¼ (Here Nr = 1 & Dr = 4)

- Hence the factor is Nr / (Dr+Nr) = 1/(1+4) = 1/5

- Multiply Sale by Factor = 400 X 1/5 = Rs 80/- is Profit.

Vedic Maths Applied to Accountancy

- Example 7: Cost Price is Rs 30,000/- Profit is 40% on Sale
- What is the Profit
- Here the factor is Nr / (Dr-Nr) = 4/(10 – 4) = 4/6 = 2/3
- Hence Profit is cost X Factor = 30,000 X 2/3 = Rs 20,000/-
- Cross Check: CP + Profit = 30,000 +20,000 = 50,000/-
- 40% on Sale is $50{,}000 \times \frac{4}{} = 20{,}000$ correct Ans

Vedic Maths Applied to Accountancy

- Technique 3:
- Example 8: I have Rs 4,000/- to invest in 2 Banks.
- SBI is paying 5% interest and BoB is paying 3% interest pa.
- Altogether I get Rs 288/- interest for 2 years.
- How much money to be invested in each bank?
- Solution:
- 1% on 4,000 = 40; Hence 5% // 3% will be 200 // 120
- The interest for 2 years is 288. Hence interest for 1 year is 144.
- If entire Rs 4,000 is invested in SBI // BoB, the interest for 1 year will be 200 // 120.
- But the interest was 144. The difference is 56 // 24
- Reverse is 24 // 56 Diving by 8 the Ratio is 3 // 7
- Hence the investment should be in the ratio of SBI // BoB :: 3 // 7
  which is 400 X 3 // 400 X 7 = Rs 1200 // 2800
- Hence the investment should be Rs 1200 in SBI and Rs 2800 in BoB.

Vedic Maths Applied to Accountancy

- CROSS CHECK
- Interest by SBI at 5% on Rs 1200 for 1 year = 60
- For 2 years = 120

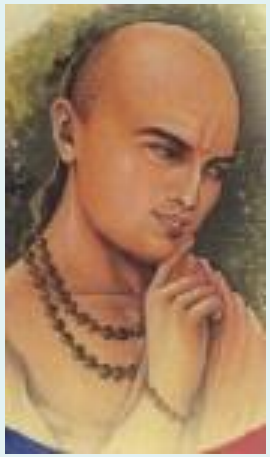
- Interest by BoB at 3% on Rs 2800 = 84
- For 2 years = 168

- Hence total Interest for 2 years is 120 + 168 = Rs 288 Verified

Vedic Maths Applied to Accountancy

- **a**

Quote by SisterNivedita



Are the countrymen of
Bhaskara &
Sankaracharya
inferior to those of
Newton and Darwin?

Sister Nivedita