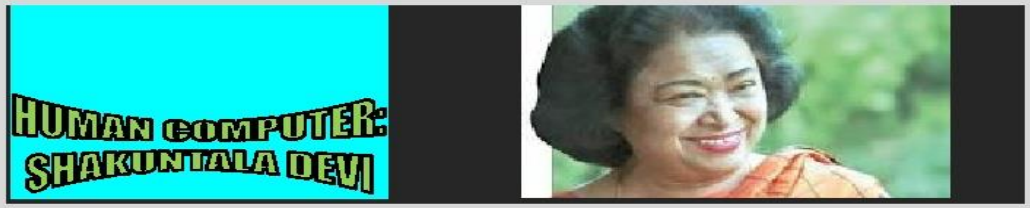
GANITHA MITRA

Mathematics club @ SASTRA



Once in a university, she took questions from the audience. At the very end, when it was time for the last question, she called one person. He asked her: 'what is 7^13?' she just laughed. 'I thought you were going to ask me something hard'.

'Well, what is it?', he persisted. She immediately gave the answer. He said 'no, that's wrong'. The audience gasped. 'Well, what answer do you have?' She asked him. He confidently read the answer off his scratch paper.

She chuckled ' Oh, I see what you did', she said. 'First you computed 7^2=49 and then 7^4=49^2=2401 and then 7^8=2401^2=5764801. And then, for the next step to get 7^12, you multiplied 7^4 by 7^8 and then you just have to multiply 7 to get the answer. But when you multiplied 2401 by 5764801, you carried wrong in the thousands column and that's why you got the wrong answer.'

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NOBEL FOR MATHS:
ABEL PRIZE
AND THE INDIAN WHO MADE IT:
Dr.SRINIVASA VARADHAN

Nobel prize is the most prestigious scholarly award in the world. But if you observe, you don't find any mathematician receiving Nobel prize.

So what do you think is the highest award given to a mathematician for his efforts in this field?
Answer is "ABEL Prize".

Neils Henrik Abel

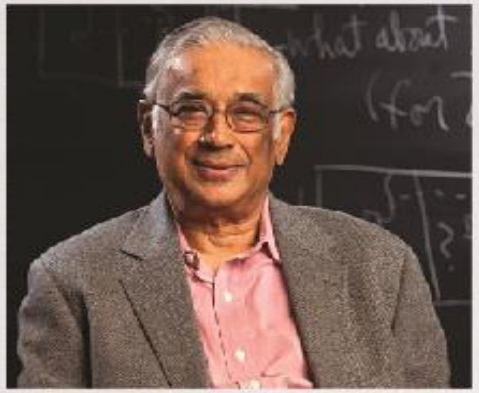
Abel prize is often described as a "Mathematician's Nobel prize". Abel prize is the international prize presented by the king of Norway to one or more outstanding mathematicians.it is named after Norwegian mathematician Niels Henrik Abel (1802-1829). The award was established in 2001 by the government of Norway and complements the Holberg prize in the humanities.

Yakov G. Sinai
Winner of Abel Prize
2014

Norwegian Academy of science and letters declares the award in every march after selection by committee of five internationally reputed mathematicians. The committee is now headed by Ragni Paine, a Norwegian mathematician. International Mathematical Union and European Mathematical society nominates members of Abel committee.

The prize was proposed to be a part of the 1902 celebrations of 100th anniversary of Abel's birth. Shortly before his death in 1899, mathematician Sophus lie proposed establishing an Abel prize when he learned that Alfred Nobel's plans for annual prizes would not include a prize in mathematics.

King oscar2 was willing to finance a mathematical prize in 1902 on the mathematicians, Ludwig Sylow and Carl Stormer drew up statutes and rules for the proposed prize. In August 2001, the Norwegian government announced that the prize would be awarded beginning in 2002, the two-hundredth anniversary of Abel's birth. The first prize was actually awarded in 2003. In 2010 A book series presenting Abel Prize laureates and their research was commenced.



Dr. Srinivasa Varadhan

Sathamangalam Ranga Iyengar Srivasa Varadhan, born on 2nd January 1940 in Chennai, is the first Indian to receive Abel prize in the year 2007 for his fundamental contributions to probability theory and in particular for creating a unified theory of large deviations.

After receiving his under graduate degree in Presidency college in Madras, he went to Indian Statistical Institute in Kolkata to pursue his career in Maths. It took thirty years for Dr. Srinivasa Varadhan in discovering the underlying general principles and begin demonstrating their tremendous scope, far beyond the classical setting of independent trials.

In his landmark paper "Asymptotic probabilities and differential equations" in 1966 and his surprising solution of Polaron problem of Euclidean quantum theory in 1959, he began to shape a general theory of large deviations that was much more than a quantitative improvement of convergence rates.

Dr. Srinivasa Varadhan with Abel Prize in 2007

His works finally address the fundamental question:
What is the qualitative behavior of a stochastic if it deviates from the ergodic behavior predicted by some law of large numbers or if it arises as a small perturbation of a deterministic system

Since 1963, varadhan is working in Courant Institute of mathematical sciences at Newyork University, where he met Daniel strook, who became his co-other.

Apart from Abel prize, Dr. Srinivasa Varadhan has received National Medal of Science, the highest honour bestowed by the United States government on scientists. He also received Birkhoff prize, the Margaret and Herman Sokol Award of the faculty of Arts and Sciences. Government of India awarded him with Padma Bhushan in 2008.

He is a member of U.S National Academy of Sciences, Norwegian Academy of Sciences, Indian Academy of Sciences and American Mathematical Society.

MAN WHO KNEW INFINITY: A BRIEF STORY OF SRNIVASA RAMANUJAN

It was in 1913, the English mathematician G. H. Hardy received a strange letter. The ten-page letter contained about 120 statements of theorems on infinite series, improper integrals, continued fractions, and number theory.

It is very routine for Hardy, of course every mathematician of his level gets letters from cranks, and at first glance Hardy no doubt put this letter in that class. But something about the formulas made him take a second look, and show it to his collaborator J. E. Littlewood. After a few hours, they concluded that the results "must be true because, if they were not true, no one would have had the imagination to invent them".

Thus was Srinivasa Ramanujan (1887-1920) introduced to the mathematical world.

Prof G.H.Hardy

Ramanujan, born in Erode district of Tamil Nadu to K. Srinivasa Iyengar, worked as a clerk in a sari shop and hailed from the district of Thanjavur. His mother, Komalatammal, was a housewife. He was a promising student, winning academic prizes in high school. On 14 July 1909, Ramanujan was married to a ten-year old bride, Janakiammal (21 March 1899 – 13 April 1994).

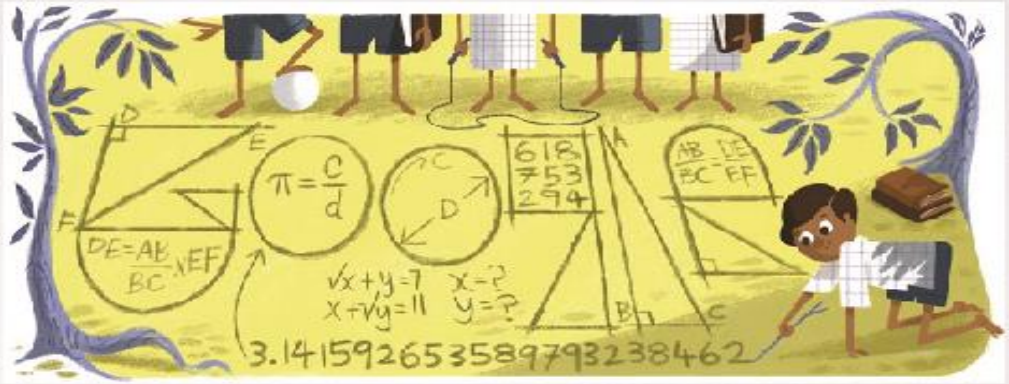
In 1903 when he was 16, Ramanujan obtained from a friend a library-loaned copy of a book by G. S. Carr. The book was titled "A Synopsis of Elementary Results in Pure and Applied Mathematics". The book was simply a compilation of thousands of mathematical results, most set down with little or no indication of proof. But in Ramanujan, it created a curiosity which later is generally acknowledged as a key element in awakening the genius. Unfortunately, his total immersion in mathematics was disastrous for Ramanujan's academic career, ignoring all his other subjects, he repeatedly failed his college exams.

As a college dropout from a poor family, Ramanujan's position was rediculous. He lived with the charity of friends, filling notebooks with mathematical discoveries and seeking patrons to support his work.Finally when the Indian mathematician Ramachandra Rao provided him with first a modest subsidy, and later a clerkship at the Madras Port trust.

During this period Ramanujan had his first paper published, a 17-page work on Bernoulli numbers that appeared in 1911 in the Journal of the Indian Mathematical Society. With the encouragement of friends, he wrote to mathematicians in Cambridge seeking validation of his work. Twice he wrote with no response; on the third try, he found Hardy.

Hardy wrote enthusiastically back to Ramanujan, and Hardy's stamp of approval improved Ramanujan's status almost immediately. Ramanujan was named a research scholar at the University of Madras, receiving double his clerk's salary and required only to submit quarterly reports on his work. But Hardy was determined that Ramanujan be brought to England. Ramanujan's mother resisted in the beginning, but finally gave in, apparently after a vision. In March 1914, Ramanujan boarded a steamer for England.

Ramanujan's arrival at Cambridge was the beginning of a very successful five-year collaboration with Hardy. In some ways the two made an odd pair: Hardy was a great exponent of rigor in analysis, while Ramanujan's results were (as Hardy put it) "arrived at by a process of mingled argument, intuition, and induction, of which he was entirely unable to give any coherent account".



GOOGLE DOODLE ON RAMANUJAN'S 125th BIRTHDAY :

NATIONAL MATHEMATICS DAY

Hardy did his best to fill in the gaps in Ramanujan's education without discouraging him. He was amazed by Ramanujan's love towards numbers. Hardy once said: "I have never met his equal, and can compare him only with Euler or Jacobi."

Ramanujan's years in England were mathematically productive, and he gained the recognition he hoped for. Cambridge granted him a Bachelor of Science degree "by research" in 1916, and he was elected a Fellow of the Royal Society (the first Indian to be so honored) in 1918.

But the alien climate and culture took a toll on his health. Ramanujan had always lived in a tropical climate. Wartime shortages only made things worse. In 1917 he was hospitalized, his doctors fearing for his life. By late 1918 his health had improved; he returned to India in 1919. But his health failed again, and he died the next year.

THE STROY OF RAMANUJAN NUMBER

Ramanujan number is one of the very famous stories of mathematics world. The number 1729 is known as the Hardy–Ramanujan number after a famous anecdote of the British mathematician G. H. Hardy regarding a visit to the hospital to see Ramanujan.

In Hardy's words:

" I remember once going to see him when he was ill at Putney. I had ridden in taxi cab number 1729 and remarked that the number seemed to me rather a dull one, and that I hoped it was not an unfavorable omen. "No", he replied, "it is a very interesting number; it is the smallest number expressible as the sum of two cubes in two different ways."

The two different ways are

$$1729 = 1^3 + 12^3 = 9^3 + 10^3.$$

Besides his published work, Ramanujan left behind several notebooks, which have been the object of much study.

The English mathematician G. N. Watson wrote a long series of papers about them. More recently the American mathematician Bruce C. Berndt has written a multi-volume study of the notebooks. In 1997 The Ramanujan Journal was launched to publish work "in areas of mathematics influenced by Ramanujan".

A WORLD WITHOUT MATHEMATICS

Let's start with a question. How often you would have thought how complex and difficult math is? There are only two types of people regarding math. Either they love math and experience the fun of it. Or they hate math to core. Let's peep into a world which doesn't have numbers, probability or any sort of mathematics.

How about planning a small trip or picnic with your friends on a holiday (say for example, Diwali)? But wait a moment! How would you say which day Diwali is without numbers to tell you the date? All day will be the same day. There will be neither a calendar nor a watch. Alas! We cannot celebrate even our birth date.

CALENDER IS SIMPLY A MATH WORK

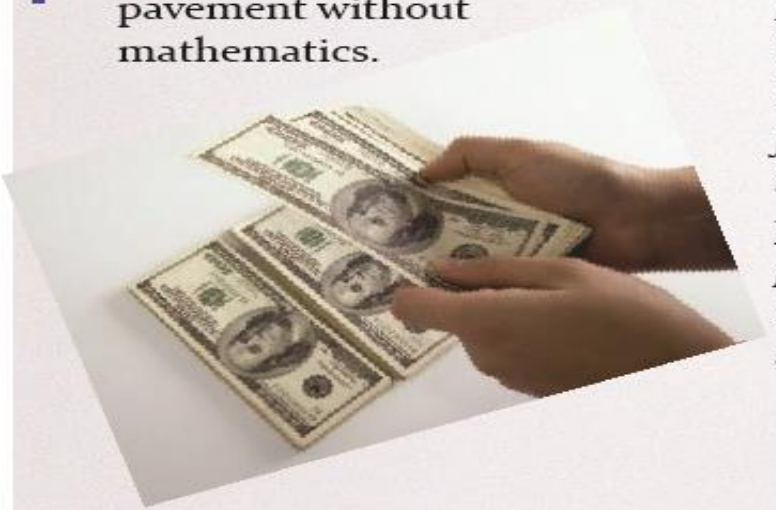
First of all a world without mathematics is null and void. You cannot possibly live in, importantly imagine, such a situation. Mathematics is a universal language for all individuals followed throughout the world in all spheres of life. Can you imagine a life without it? What do you think??

PANORAMA IMAGE IS FULL OF MATHS

It is really impossible even to eat or play without involving mathematics in it. Consider throwing or kicking a ball. It involves speed, angle, geometry and spatial relationships. Try cooking a recipe without correct ratio or proportion of ingredients. No one will taste it. A chemist cannot prepare medicines if he cannot measure chemicals accurately. A doctor cannot check your heartbeat without counting.

We wouldn't have market or business as the world if trade runs on money for which math is the essential thing. If there is no economic development wouldn't that be a problem?

We couldn't even imagine the development if technology. We all believe that computer is the basic component for the technological development. The basic language that computer can understand is bits, which is nothing but numbers 'o' and '1'!!! Imagine a world without mobile phones and internet, which all involves mathematics indirectly. An Engineer cannot even build a small pavement without mathematics.



A DIGITAL WORLD IS FULL OF 1s and 0s

Mathematics tells you how much money you have spent, when your favorite show is on screen, what size of cloth you should wear. From poor to rich everyone has to use mathematics in some point of their life.

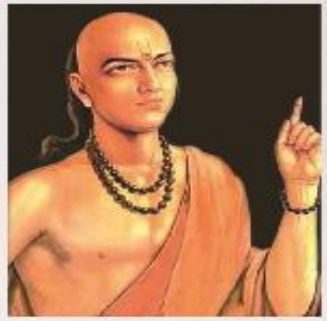
Mental arithmetic helps us a lot in saving hundreds of pounds or dollars in the supermarket. And if we have knowledge of statistics it will help you us see through the claptrap in television adverts or newspapers.

NOISE REDUCTION IN IMAGES

We can conclude from the above discussion that a modern life style is completely handicapped and highly improbable, in the absence of mathematics. Unless we are well versed with numbers, we would find it difficult to reach at important decisions and perform everyday tasks. Be it to shop wisely, or refashion a home within a budget, knowledge of mathematics holds the key, and hence, barely necessary.

And to add Math is not complicated or difficult as people think. It is their attitude that makes it so.

UNCOVER THE ORIGINS OF NUMBERS:
FINDNG ZERO

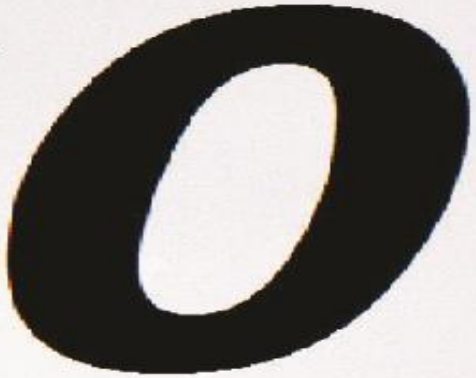


Understanding and working with zero is the basis of our world today; without zero we would lack calculus, financial accounting, the ability to make arithmetic computations quickly, and, especially in today's connected world, computers.

Zero -

how often has a question been answered by this word?

Countless, no doubt. Yet behind this seemingly simple answer conveying nothing lays the story of an idea that took many centuries to develop, many countries to cross, and many minds to comprehend. The story of zero is the story of an idea that has aroused the imagination of great minds across the globe



When anyone thinks of one hundred, two hundred, or seven thousand the image in his or her mind is of a digit followed by a few zeros. The zero functions as a placeholder; that is, three zeroes denotes that there are seven thousands, rather than only seven hundreds. If we were missing one zero, that would drastically change the amount. Just imagine having one zero erased (or added) to your salary!

If we have a look through the history, story of birth of "ZERO" can be seen as follows:

The Sumerians were the first to develop a counting system to keep an account of their stock of goods - cattle, horses, and donkeys, for example. The Sumerian system was positional; that is, the placement of a particular symbol relative to others denoted its value. The Sumerian system was handed down to the Akkadians around 2500 BC and then to the Babylonians in 2000 BC. It was the Babylonians who first conceived of a mark to signify that a number was appeared.

The renowned mathematicians among the Ancient Greeks, who learned the fundamentals of their math from the Egyptians, did not have a name for zero, nor nor did their system feature a placeholder as did the Babylonian.

It was the Indians who began to understand zero both as a symbol and as an idea. Brahmagupta, around 650 AD, was the first to formalize arithmetic operations using zero. He used dots underneath numbers to indicate a zero. These dots were alternately referred to as “sunya”, which means empty, or “kha”, which means place. Brahmagupta wrote standard rules for reaching zero through addition and subtraction as well as the results of operations with zero. The only error in his rules was division by zero, which would have to wait for Isaac Newton and G.W. Leibniz to tackle.

But it would still be a few centuries before zero reached Europe. First, the great Arabian voyagers would bring the texts of Brahmagupta and his colleagues back from India along with spices and other exotic items. Zero reached Baghdad by 773 AD.

In the ninth century, Mohammed ibn-Musa al-Khowarizmi was the first to work on equations that equaled zero, or algebra as it has come to be known.

The Italian mathematician, Fibonacci, built on Al-Khowarizmi's work with algorithms in his book Liber Abaci, or "Abacus book," in 1202. Until that time, the abacus had been the most prevalent tool to perform arithmetic operations. Fibonacci's developments quickly gained notice by Italian merchants and German bankers, especially the use of zero.

The next great mathematician to use zero was Rene Descartes, the founder of the Cartesian c oordinate system. As anyone who has had to graph a triangle or a parabola knows, Descartes' origin is (0,0). Although zero was now becoming more common, the developers of calculus, Newton and Lebinitz, would make the final step in understanding zero.

Adding, subtracting, and multiplying by zero are relatively simple operations. But division by zero has confused even great minds. How many times does zero go into ten? Or, how many non-existent apples go into two apples? The answer is indeterminate, but working with this concept is the key to calculus.

If you wanted to know your speed at a particular instant, you would have to measure the change in speed that occurs over a set period of time. By making that set period smaller and smaller, you could reasonably estimate the speed at that instant. In effect, as you make the change in time approach zero, the ratio of the change in speed to the change in time becomes similar to some number over zero - the same problem that stumped Brahmagupta.

In the 1600's, Newton and Leibnitz solved this problem independently and opened the world to tremendous possibilities. By working with numbers as they approach zero, calculus was born without which we wouldn't have physics, engineering, and many aspects of economics and finance.

The development of zero across continents, centuries, and minds has made it one of the greatest accomplishments of human society. Because math is a global language, and calculus its crowning achievement, zero exists and is used everywhere.

PUZZLE-O-MANIA

A matter of time:

Fifty minutes ago if it was four times as many minutes past three o' clock, how many minutes is it to six o' clock ?

The Sixteen Fours :

How can you make a total of 1000 using sixteen 4's ?

Age of Democharess :

Democharres had lived one fourth of his life as a boy, one fifth as a youth, one third as a man, and has spent thirteen years in his dotage. How old is Democharess ?

AN INTERVIEW WITH DR.K.KANNAN SIR

1. *What is good teaching?*

Good teaching will always involve interactions with the students in the form of questions and answers, recapitulating the earlier knowledge in the form of questions, explaining the concepts in the form of figures, computations, algorithm, question-answers so as to bring the talent in a different taught process among audience of various groups.

2. *What is your teaching philosophy?*

Teaching philosophy includes inspiring students to think on their own in various applicable mathematical concepts with examples, counter examples and demonstrations with the teaching aids.

3.***What are the qualities of a good instructor?***

Demonstration and Inspiration

4. *What is your current research area?*

Computational mathematics in image processing with special reference to meteorological application.

5. *Why do we need mathematics in engineering?*

To bring out human imagination into a constructive idea of establishing tools. Mathematics is necessary for modeling purposes in the form geometry operators and algorithm, to bring out the human perception through ideas using mathematical modeling and scientific phenomena.

6. Why did you choose Mathematics as your career?

Mathematics is precise science, evolution of various shortcut methods not only in the theory of numbers but also in various computational processes which bring blossom of mind and love towards the subject. Quizzes, riddles usually bring out not only the latent talents but also a process mind setup. Problem orientation of the subject brings the curiosity to engage in the learning process. A teacher taught interaction in mathematics in the form of question and answers induce deeper memory in human and an inquisitive thought in the human mind.

7. Give a few motivational points and suggestions for engineering students.

Today many of the aptitude test involves mathematical questions that need a quick thought process. Vedic mathematics in the form of verses from sanskrit induce good memory power in students minds. However, not much work has come out in the form of programmable mathematics. If subjects like actuarial sciences, vedic computational mathematics are introduced in the higher

secondary level, students will have better knowledge while entering into their college studies.

8. Are the existing tools sufficient to compute all the engineering problems?

Problems grow bigger day by day. So, naturally applications of mathematics will also grow day by day. And that is why students study both mathematical programming and programmable mathematics. When computing tools are insufficient, one usually approaches the mathematics literature to bring out concepts from operations as such for establishing engineering optimization. The subjects in pure mathematics pave way for evolution of new algorithms, techniques and heuristics. One example is evolution of wavelet transform from functional analysis.

Math club @ SASTRA and its beginning

The effort of a second year student led to the formation of MCS under the guidance of Prof. C.Natrajan(AP-III) with the great support from The DEAN H & S and The DEAN T&P on feb 14th 2013 with 30 second year students. Now, it has emerged as the one of the most hardworking clubs in SASTRA with the team of 50 efficient members comprising of students from all departments and years of BTech in SASTRA. The club has records of actively conducting events for various technical fests in SASTRA, academic classes for BTech students, workshops, KLF(Knowledge Learning Forum), delivering guest lectures at various schools in and around SASTRA. By the year 2015, club has started its own website and has published its first Magazine. Many members in the club are working on emerging research areas in the field of mathematics like Graph theory, computational mathematics, flow dynamics, statistics and Number theory.

FROM

MATHS CLUB @ SASTRA