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DEPARTMENT OF MATHEMATICS

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From the Editors Desk

Esteemed Readers,

With great enthusiasm and anticipation, I extend a heartfelt welcome to the Mathematics Magazine **‘GANITH’**. As we unfurl the pages of this scholarly endeavor, we embark on a journey of intellectual exploration, envisaging a future where ideas converge, and knowledge converges to shape the discourse of our chosen domain. Our motto is, “Maths for all” and “All for Maths”. In conceiving **‘GANITH’**, our primary ambition is to incorporate this motto, and to serve as a crucible for cutting-edge research, and original thought in the field of mathematics. We extend our gratitude to all the scholars who contributed in bringing out this idea and making it a more entertaining yet informative and simple. As we launch this journal, we express our profound gratitude to the academic community whose collective wisdom has paved way for this venture. We hope **‘GANITH’** ignites you.

Yours Sincerely,

Dr. S.S. Sandhya

Editor-in Chief, GANITH

Message from the Principal

I am pleased to announce the release of our annual mathematics magazine, **Ganith**. This Publication is a Testament to the dedication and expertise of our faculty and student in the field of mathematics.

I would like to extend my gratitude to everyone who contributed to the magazine showcasing the depth of our department achievement and research. Your commitment to advancing mathematical knowledge is truly commendable.

I encourage all members of the mathematics community to take a moment to explore the insightful articles, research findings and other valuable contribution within Ganith.

Let this magazine serve as an inspiration for continued excellence in our pursuit of mathematical understanding. Thank you for your hard work and congratulations on the successful publication of Ganith.

Dr. V.R. Anjana

Principal

Message from the HOD

Mathematics holds immense importance in various aspects of our lives. It serves as a universal language, facilitating communication and understanding in diverse fields. From basic arithmetic to advanced calculus, mathematics provides a foundation for problem-solving and critical thinking. Its applications extend into everyday activities. In science and technology, mathematics is the driving force behind innovations, shaping advancements in physics, engineering, and computer science. Mathematics not only enhances cognitive skills but also encourages creativity and innovation by providing a structured framework for exploring ideas. Many lucrative careers, such as finance, architecture, and data analysis, rely heavily on mathematical principles. Being mathematically literate is essential in navigating a data-driven world, fostering quantitative literacy.

Mathematics not only enhances cognitive skills but also encourages creativity and innovation by providing a structured framework for exploring ideas. It encourages individuals to explore the beauty of mathematical concepts and their real-world applications.

The historical development of mathematics reflects human curiosity and the innate desire to understand the underlying order of the universe. Mathematical principles guide the design and analysis of experiments in scientific research, ensuring rigorous and reliable results. The importance of mathematics in shaping economic policies and understanding market trends is evident in fields like economics and finance. Mathematics serves as a gateway to advanced technological developments, playing a crucial role in the design and optimization of algorithms. In essence, mathematics is not just a subject but a fundamental tool that empowers individuals, drives innovation, and enriches our understanding of the world.

Our Magazine stands as a testament to the collective brilliance of our team. Let us work as a team to popularise the “Queen of Sciences”. I am happy that our students have been taking sincere interest to popularise the subject. I am sure that the variety of items presented will be liked by the readers.

My best wishes to all the readers.

Dr. S.S. Sandhya

HOD, Department of Mathematics

Geometry – The Sound of Mathematics

Dr. K.R. Shoba
Dept of Mathematics

Mathematics is the building block for everything in our mundane lives, including mobile devices, architecture (ancient and modern), art, money, engineering, sports and even music.

Geometry shapes the sound of music. Even through the ages, scholars have suspected that the mysterious force that shapes the melodies that catch the ear and lead the voice is none other than mathematics. A trio of 21st-century music professors from Florida State University, Yale University and Princeton University have analyzed and categorized in brand-new ways the mathematics intrinsic to musical harmony.

Their cutting-edge collaboration has produced a powerful tool they call "geometrical music theory", which translates the language of music theory into that of contemporary geometry. Geometrical music theory represents a culminating moment in the longstanding marriage of music and mathematics. That marriage began when Pythagoras described pleasing musical intervals with simple mathematical ratios more than 2,600 years ago and which further evolved during the Middle Ages when deep thinkers used those same ratios to model the "music of the spheres"; what many at that time believed to be the literally harmonious movements of the sun, moon and planets.

Understanding and interpreting music is a process of discarding information, which in turn is the key to discovering its underlying mathematical structure. If one might go into details, it is revealed that at each level of abstraction, musical objects are grouped into families of chords or melodies. Mathematical structure is assigned to the "families" so that they can be represented as points within complex geometrical spaces in much the same way that "x" and "y" coordinates correspond to points on a two-dimensional plane in simple high school algebra. The different families produce an exotic maze of diverse geometrical spaces such as twisted triangular donuts and pinched cones -- and even some spaces that mathematicians haven't dreamed up names for yet.

Cutting it short, it can be concluded that mathematics is indeed the soul of everything and does synchronizes with the nature with its beautiful harmony in the form of geometry.

Did you Know?

Dr. R.S. Sheeba
PG Dept of Mathematics

Abacus is considered the origin of the calculator.

12,345,678,987,654,321 is the product of 111,111,111 x 111,111,111. Notice the sequence of the numbers 1 to 9 and back to 1.

Plus (+) and Minus (-) sign symbols were used as early as 1489 A.D.

An icosagon is a shape with 20 sides.

From 0 to 1000, the letter "A" only appears in 1000 ("one thousand").

A 'jiffy' is an actual unit of time for $1/100^{th}$ of a second.'

'FOUR' is the only number in the English language that is spelt with the same number of letters as the number itself.

In a group of 23 people, at least two have the same birthday with the probability greater than ½.

Among all shapes with the same perimeter a circle has the largest area.

Among all shapes with the same area circle has the shortest perimeter.

In 1995 in Taipei, citizens were allowed to remove '4' from street numbers because it sounded like 'death 'in Chinese. Many Chinese hospitals do not have a 4^{th} floor.

The word "FRACTION" derives from the Latin "fractio- to break"

How a 19th Century Math Genius Taught Us the Best Way to Hold a Pizza Slice?

Anchu S Kumar
(Research Scholar)

A surprising geometrical link between curvature and strength. We've all been there. You pick up a slice of pizza and you're about to take a bite, but it flops over and dangles limply from your fingers instead. The crust isn't stiff enough to support the weight of the slice. Maybe you should have gone for fewer toppings. But there's no need to despair, for years of pizza eating experience have taught you how to deal with this situation. Just fold the pizza slice into a U shape (aka the fold hold). This keeps the slice from flopping over, and you can proceed to enjoy your meal. (If you don't have a slice of pizza handy, you can try this out with a sheet of paper.) Dangle a sheet of paper and it flops over, but give it a fold and it becomes stiff. Why?

Behind this pizza trick lies a powerful mathematical result about curved surfaces, one that's so startling that its discoverer, the mathematical genius Carl Friedrich Gauss, named it Theorema Egregium, Latin for excellent or remarkable theorem.

Take a sheet of paper and roll it into a cylinder. It might seem obvious that the paper is flat, while the cylinder is curved. But Gauss thought about this differently. He wanted to define the curvature of a surface in a way that doesn't change when you bend the surface.

If you zoom in on an ant that lives on the cylinder, there are many possible paths the ant could take. It could decide to walk down the curved path, tracing out a circle, or it could walk along the flat path, tracing out a straight line. Or it might do something in between, tracing out a helix.

Gauss's brilliant insight was to define the curvature of a surface in a way that takes all these choices into account. Here's how it works. Starting at any point, find the two most extreme paths that an ant can choose (i.e. the most concave path and the most convex path). Then multiply the curvature of those paths together (curvature is positive for concave paths, zero for flat paths, and negative for convex paths). And, voila, the number you get is Gauss's definition of the curvature at that point.

Let's try some examples. For the ant on the cylinder, the two extreme paths available to it are the curved, circle-shaped path, and the flat, straight-line path. But since the flat path has zero curvature, when you multiply the two curvatures together you get zero.

As mathematicians would say, a cylinder is flat – it has zero Gaussian curvature. Which reflects the fact that you can roll one out of a sheet of paper.

If, instead, the ant lived on a ball, there would be no flat paths available to it. Now every path curve by the same amount, and so the Gaussian curvature is some positive number. So, spheres are curved while cylinders are flat. You can bend a sheet of paper into a tube, but you can never bend it into a ball.

Gauss's remarkable theorem, the one which I like to imagine made him giggle with joy, is that an ant living on a surface can work out its curvature without ever having to step outside the surface, just by measuring distances and doing some math. This, by the way, is what allows us to determine whether our universe is curved without ever having to step outside of the universe (as far as we can tell, it's flat).

A surprising consequence of this result is that you can take a surface and bend it any way you like, so long as you don't stretch, shrink or tear it, and the Gaussian curvature stays the same. That's because bending doesn't change any distances on the surface, and so the ant living on the surface would still calculate the same Gaussian curvature as before.

This might sound a little abstract, but it has real-life consequences. Cut an orange in half, eat the insides (yum), then place the dome-shaped peel on the ground and stomp on it. The peel will never flatten out into a circle. Instead, it'll tear itself apart. That's because a sphere and a flat surface have different Gaussian curvatures, so there's no way to flatten a sphere without distorting or tearing it. Ever tried gift wrapping a basketball? Same problem. No matter how you bend a sheet of paper, it'll always retain a trace of its original flatness, so you end up with a crinkled mess.

What does any of this have to do with pizza? Well, the pizza slice was flat before you picked it up (in math speak, it has zero Gaussian curvature). Gauss's remarkable theorem assures us that one direction of the slice must always remain flat – no matter how you bend it, the pizza must retain a trace of its original flatness. When the slice flops over, the flat direction (shown in red below) is pointed sideways, which isn't helpful for eating it. But by folding the pizza slice sideways, you're forcing it to become flat in the other direction – the one that points towards your mouth. Theorem egregium, indeed.

By curving a sheet in one direction, you force it to become stiff in the other direction. Once you recognize this idea, you start seeing it everywhere. Look closely at a blade of grass. It's often folded along its central vein, which adds stiffness and prevents it from flopping over. Engineers frequently use curvature to add strength to structures. In the Zarzuela race track in Madrid, the Spanish structural engineer Eduardo Torroja designed an innovative concrete roof that stretches out from the stadium, covering a large area while remaining just a few inches thick. It's the pizza trick in disguise.

Strength through curvature is an idea that shapes our world, and it has it roots in geometry. So, the next time that you grab a slice, take a moment to look around, and appreciate the vast legacy behind this simple pizza trick.

Reference:

https://www.wired.com/2014/09/curvature-and-strength empzeal/#:~:text=Well%2C%20the%20pizza%20slice%20was,trace%20of%20its%20original%20flatness.

Life Through the Eyes of a Mathematician

Mathematics is in every aspect of our lives; from a mother-child relationship to a person's every need. The emotional distance between a mother-child can be minimised, i.e. there exists a Delta > 0 for which we have Epsilon > 0. A mother always tends to a child, who is a limit to her. Every person has ∞ desires to fulfil despite knowing the fact that ∞ is not a real number. Human beings generally behave like a modulus function as they react positively or negatively according to the circumstances or people around them; whenever a person is looking forward to a positive outcome from a situation, he takes the positive values otherwise he chooses to remain indifferent by taking the negative values. Friends are like limitless functions separately but together they become a constant function. College students resemble 'unlike terms' of algebra, that is, until the lunch break. The Cafeteria then becomes their limit point of enjoyment as there exists a lot of points in that interval of time. A group of friends is like an integral domain because of the absence of zero divisors which implies there exists two friends such that (1^{st} friend x 2^{nd} friend) = 0 as their love for each other makes them an identity together. Teachers are synonymous with integration as they increase the capabilities of a constant student with their knowledge and magnify a student's capabilities. The most important lesson Mathematics teaches us is the will to never give up as every problem has a solution.

The Fibonacci Sequence: When Maths Turns Golden Unbound

P.S. Akhshaya
(Research Scholar)

Learn how to see, and realize that everything connects to everything else: **Leonardo Da Vinci** Fibonacci Sequence has captivated Mathematicians, artists, designers, and scientists for centuries. Wondering what's so special about it? Let us begin with the history.

The original problem that Leonardo Fibonacci investigated (in the year 1202) was about how fast rabbits could breed in ideal circumstances. Suppose a newly-born pair of rabbits, one male, and one female are put in a field. Rabbits are able to mate at the age of one month so that at the end of its second month, a female can produce another pair of rabbits. Suppose that our rabbits never die and that the female always produces one new pair (one male, one female) every month from the second month on. The puzzle that Fibonacci posed was... How many pairs will there be in one year? Think! No?

Let me help you. At the end of the first month, they mate, but there is still one only 1 pair.

At the end of the second month, the female produces a new pair, so now there are 2 pairs of rabbits in the field.

At the end of the third month, the original female produces a second pair, making 3 pairs in all in the field.

At the end of the fourth month, the original female has produced yet another new pair, the female born two months ago produces her first pair also, making 5 pairs.

Can you see the pattern here? 1, 1, 2, 3, 5, 8, 13, 21, 34……

The solution, generation by generation, was a sequence of numbers later known as Fibonacci numbers.

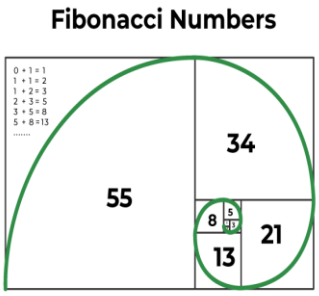
Fibonacci Sequence is a set of numbers that start with a one, followed by a one, and proceeds based on the rule that each number is equal to the sum of the preceding two numbers. The Fibonacci numbers can be thought of as Nature's numbering system. They appear everywhere in Nature, from the leaf arrangement in plants to the pattern of the florets of a flower, the bracts of a pinecone, or the scales of a pineapple. The Fibonacci numbers are therefore applicable to the growth of every living thing, including a single cell, a grain of wheat, a hive of bees, and even all of mankind. In the seeming randomness of the natural world, we can find many instances of a Mathematical order involving the Fibonacci numbers themselves and the closely related "Golden" elements.

Let's add one more interesting thing here: If we take the ratio of two successive numbers in Fibonacci's series, (1, 1, 2, 3, 5, 8, 13...) and we divide each by the number before it, we will find the following series of numbers:

1/1 = 1, 2/1 = 2, 3/2 = 1·5, 5/3 = 1·666..., 8/5 = 1·6, 13/8 = 1·625, 21/13 = 1·61538...

The ratio seems to be settling down to a particular value, which we call the 'golden ratio' or 'the golden number'. It has a value of approximately 1·618034 and we denote it by "Phi".

Now, let's get acquainted with some of the endless examples that make Fibonacci a wonder or 'Golden' sequence.



Flower petals: The number of petals in a flower consistently follows the Fibonacci sequence. Famous examples include the lily, which has three petals, buttercups, which have five, the chicory's 21, the daisy's 34, and so on. Each petal is placed at 0.618034 per turn (out of a 360° circle) allowing for the best possible exposure to sunlight and other factors.

Seed heads: The head of a flower is also subject to Fibonaccian processes. Typically, seeds are produced at the centre and then migrate towards the outside to fill all the space. Sunflowers provide a great example of these spiralling patterns.

Likewise, similar spiralling patterns can be found on fruits and vegetables like pineapples and cauliflower. Snail shells and nautilus shells follow the Fibonacci pattern, as does the cochlea of the inner ear. It can also be seen in the horns of certain goats, and the shape of certain spider's webs.

Not surprisingly, spiral galaxies also follow the familiar Fibonacci pattern. Faces, both human and nonhuman, abound with examples of the Golden Ratio. The mouth and nose are each positioned at golden sections of the distance between the eyes and the bottom of the chin for a supposedly perfect face. Also, looking at the length of our fingers, each section — from the tip of the base to the wrist — is larger than the preceding one by roughly the ratio of phi.

Speaking of honey bees, they follow Fibonacci in other interesting ways. The male bees develop from unfertilised eggs of the queen bee. The male bee technically has only a mother and no father. The first generation has one member (the male). One generation back also has one member (the mother). Two generations back are two members (the mother and father of the mother). Three generations back are three members. Four back are five members. That is, the numbers in each generation going back are 1,1,2,3,5,8...

Hence, we see that the ubiquity and astounding functionality of Fibonacci in nature suggests its importance as a fundamental characteristic of the Universe. The Fibonacci of fun thus continues forever and ever. Fascinating, isn't it?

Inauspicious Number 13?

There is a popular maxim which states that the best way to predict the future is to look into the past. History has time and again proven the number 13 to be a diabolical entity, sneaking in corners, ready to cause bad omens and accidents, so much so that the fear of this number over the centuries has compounded manifold to the point of causing looks of horrors at the prospect of residing at the "13th floor" of a building. The fear of this number has its own personalised jargon known as "Triskaidekaphobia". It is a combination of Greek words "tris", meaning "three", "kai", meaning "and", "deka" meaning "ten" and "phobia" meaning "fear".

• Apollo 13 was launched on 11 April and it underwent explosion on 13th of April (2 thirteens). Zoroastrian tradition predicts chaos in the 13th millennium.

• Another example is the Columbia Space Shuttle. This one went into space on 1/16/2003. Add all the numbers and you will get the number 13. During its re-entry into Earth, it exploded. All the crew members died.

• Many hotels in China and America don't have a 13th floor. After 12th, either they have 12 and a half or 14th. Same goes for the number of houses too.

• Even Microsoft considers the number 13 very unlucky and that is the reason why there is no version 13 of Microsoft office. The version 12 is Microsoft Office 2007 and the next version Microsoft Office 2010 is actually version 14. Thus, the company skipped number 13 altogether. But just because some superstition is blindly acknowledged, does it make it true? Does this number really deserve this notoriety? I beg to differ.

• In ancient Greece, Zeus is considered as the thirteenth and the most powerful God. This thirteenth God seems to be associated with totality, completion, and attainment.

• The ladder to eternity has thirteen steps, on reaching the 13th step, it is assumed that your soul attains spiritual completion.

• 13 is a prime number, which means it cannot be divided by any number other than itself. Hence, symbolizes qualities of incorruptible nature and purity.

• In one of the most powerful civilizations of history, the Aztecs decided to have 13 days in a week as they considered 13 to be an extremely lucky number. Each day was ruled by one God. And the God who ruled the thirteenth day was associated with mystery, psyche, and magic.

• As we all know, 13 is the age of change or transition for every girl or boy. It is the age when children officially become teenagers.

• The US flag has 13 strips, that represent the union of 13 colonies to fight the British rule, later these 13 colonies became the first thirteen states of United States of America.

• The Thai New Year (Songkran Day) is celebrated on the 13th April. It is considered to be a day of washing away all the bad omens, by splashing water on people, friends, and relatives.

• In Hindu mythology, Maha Shivratri is celebrated on the thirteenth night of the Magha month, which is very sacred and a holy night for all the Shiva devotees.

• In the sacred book of the Sikhs, the "Guru Granth Sahib", the word "Waheguru" which means eternal guru appears 13 times. The list goes on. Being a student of Mathematics, the first thing I learnt was that for a phenomenon to be true, there must be no exceptions. The phenomenon must be proved for every single condition. The fact that we are able to find numerous exceptions to this phenomenon is proof enough for it to be baseless superstition.

Mathematics – A Learning Language

Nayana.M. V
(Research Scholar)

Like the crest of the peacock,
Like the gem on the head of a snake,
So is mathematics at the head of all knowledge.

Mathematics is one of the most famous subjects. It is the story of logic and reasoning which has been passed on from generations to generations, since time immemorial. The range of applications that mathematics has is: incredible. It's comparable to the range between the size of a virus and the planet, Jupiter! We use mathematics in every aspect of life: from waking up in the morning and watching the time to calculate whether we'll get late for our work - to - dividing the bill amongst our friends - to - using Google to search something or the other. Mathematics is omnipresent. Even while studying subjects other than mathematics, knowingly or unknowingly we use mathematics.

Let's try to explore some of the uses of mathematical concepts in different areas of human knowledge and appreciate the intricate intertwining of mathematics with other subjects.

Starting with Physics: If two subjects are really inseparable then it's definitely Physics and Mathematics. From the calculating speed, velocity and acceleration using simple formulae or deriving them using calculus, finding the focal length of a lens or building a telescope using the lens, finding the frequency of an oscillating pendulum or predicting the existence of a heavenly body like Neptune just by calculation! These and a lot of other concepts of physics have a mathematical base.

Fine arts help us visualize the wonders that mathematics has in it. Optimization: the concept of optimum usage comes into play for making paintings by using medium based paints like oil or water. Perfect amounts of medium and color bring out the best in the paintings and help them survive long with the artwork being still vibrant. Also, concepts of ratio, proportion, symmetry, geometry, tessellation, fractals etc. have beautifully helped the artistic world blossom to its fullest. Together art and mathematics have created the aesthetic world that we proudly live in!

In Chemistry: As per law of conservation of mass, in a chemical reaction, the mass of reactants should be equal to the mass of products. So, every chemical equation must be balanced… and arithmetic (a part of mathematics) ensures this. Forming the basics, the periodic table, having more than 100 elements, that differ from each other due to number of nucleons in present them to some advanced areas like understanding behaviour of solids, liquids and gases using graphs and preparing semiconductors using the idea of ratios and proportions for desired optimal result, mathematics takes care of everything.

Commerce and mathematics go hand in hand. Trade, check on GDP, formulation of economic policies, accounting, etc. without mathematics will be reduced to just theory with no practical use. Even common activities like buying and selling items will become difficult!

Mathematics in Agriculture plays a very crucial role. The idea of optimization is fully exploited in this area. Starting from deciding the best season for growing the crops and the optimal area for doing the farming, and to ploughing, sowing seeds, irrigating and harvesting them; each and every step is completely based on the concept of optimization. How many seeds should be sown in a particular area and would be irrigated at what frequency to result in bountiful harvests thus maximizing the profits! This modern era that we live in, is due to the use of mathematics in computer science (CS). Binary math, logic, counting, probability, recurrences, graph theory and discrete math form the foundation of this subject. Computers, mobiles, security systems, robots, etc. are some invaluable products of this union of math and CS. Had it not been the use of math in CS, learning across the world, in the pandemic of 2020 would have come to a halt. Thankfully, it has not.

Mathematics in sports is omnipresent. From the technique of playing a sport like calculating the perfect angle to hit the ball to marking the perfect running track to predicting the result of a cricket match by DLS if raining interrupts it and till the final result is announced in all the other sports, math is used everywhere vividly. Chess is the most beautiful example of a mathematical sport!

At first, it's difficult to imagine the purpose of a subject like mathematics in language. But, when observed, words are the base of language, and syllables are the building blocks of words. And it is the perfect pattern of syllables that give poems and other literary pieces their beautiful and melodious flow, which is covered under the area of arithmetic.

Last but not the least, let us see what role mathematics plays in the subject of History. It can be clearly observed that history without dates and timelines is illusion and timelines without mathematics is confusion. Ancient, medieval and modern ages are there because math helped us to differentiate them on the basis of calculation of dates!

Thus, it can be said that those who have completely understood the various concepts of mathematics can excel at any subject because every subject contains some or the other applications of mathematics in it. If all the other subjects are bricks, then mathematics is the sand that gives them their base and helps us construct our serene world.

Mathematics is the language in which God has written the Universe. - Galileo Galilei

Harmonizing Numbers: Exploring the Mathematical Symphony of Music

B. Bensy Bell
(Research Scholar)

Introduction:

In the vast realm of human creativity, the intersection of music and mathematics forms a captivating symphony that transcends the boundaries of art and science. This article embarks on a journey to unravel the intricate connections between these seemingly disparate realms, showcasing the profound ways in which numbers and notes harmonize.

Rhythmic Precision: The Mathematical Dance of Beats

At the core of every musical composition lies rhythm—an intricate dance of beats that can be precisely understood through mathematical patterns. From simple time signatures to complex polyrhythms, the heartbeat of music reveals the beauty of mathematical order.

Melodic Mathematics: The Elegance of Patterns in Tunes

Melodies, the soul of music, often unveil hidden mathematical structures. From the Fibonacci sequence subtly woven into melodies to the mathematical elegance behind scales and intervals, the art of creating a captivating tune is a mathematical endeavor.

Harmony in Numbers: The Mathematical Craft of Chords

Harmony, the marriage of different notes, is a mathematical tapestry that underlies the emotional depth of music. Chords, chord progressions, and their mathematical relationships form the foundation of musical expression, transforming raw numbers into aural emotions.

Algorithmic Composition: Music Composed by Numbers

In the digital age, algorithms play a role in crafting music. From algorithmic compositions that generate intricate musical pieces to the use of mathematical models in electronic music production, mathematics becomes the architect of innovative sonic landscapes.

Music and Prime Numbers: A Harmonious Connection

Prime numbers, those indivisible numerical entities, find an unexpected yet harmonious place in music. Composers and theorists have explored the mystique of primes, incorporating them into rhythmic patterns and experimenting with their unique properties in musical compositions.

Conclusion:

In the intricate dance between music and mathematics, we find a synthesis of logic and emotion, order and creativity. From the rhythmic heartbeat to the melodic journey and harmonic embrace, the marriage of these two disciplines creates a symphony that resonates across the ages. As we delve deeper into the mathematical underpinnings of music, we discover that every note, every beat, and every harmony is a manifestation of the beauty that emerges when numbers become music.

Maths a challenge

Hepsiyal Kirupavathy
(II M.Sc Mathematics)

Try, try and try, the more I try, the more I cry.

I practice maths with my heart and soul, yet I am not able to achieve my goal. I never get marks in maths, inspite of my great endeavors fate is never in my favour. I really want to improve my maths, because I love this subject, and for this I am trying my level best. I am candid so I confess, in mathematics examination I always create a mess, all the answers I guess, 2 and ultimately the marks I get are quite less. I believe that if I do ample practice, I'll one day probably achieve my goal, and I seriously have to improve, because in our lives maths plays a very significant role.

Famous Mathematician Raman Parimala

A.R.Harani
(III B.Sc Mathematics)

Raman Parimala was born in 1948 and raised in Tamilnadu, India. She studied at the Saradha Vidyalaya Girls' High School and Stella Maris College at Chennai. She received her M.Sc. from Madras University (1970) and her Ph.D. from Bombay University (1976). For many years, she was a professor at the Tata Institute of Fundamental Research in Mumbai (Bombay), and she has held visiting positions at the Swiss Federal Institute of Technology (ETH) in Zürich, the University of Lausanne, University of California- Berkeley, University of Chicago, Ohio State, and the University of Paris at Orsay. In 2005 Parimala was appointed the Asa Griggs Candler Professor of Mathematics at Emory University in Atlanta, Georgia.

Parimala works in algebra. Her research uses tools from number theory, algebraic geometry, and topology. She is a fellow of all three Indian academies of science. She was an invited speaker at the International Congress of Mathematicians in Zürich in 1994 and a plenary speaker at the 2010 ICM in Hyderabad. Her research has been recognized with the Bhatnagar Prize in 1987, an honorary doctorate from the University of Lausanne in 1999, and the Srinivasa Ramanujan Birth Centenary Award in 2003.

Parimala received the 2005 prize in mathematics from the Academy of Sciences for the Developing World for "her work on the quadratic analogue of Serre's conjecture, the triviality

of principal homogeneous spaces of classical groups over fields of cohomological dimensions 2 and the μ-invariant of p-adic function fields." Prizes in the amount of $10,000 are awarded annually to scientists from developing countries who have made outstanding contributions to the advancement of science. This was the first time in the 20-year history of the TWAS awards that a woman had been honored with the prize in either mathematics or physics.

The following is quoted from the 2005 press release:

Raman Parimala has been described as a "supreme and powerful algebraist". Early in her career, she published the first example of a nontrivial quadratic space over an affine plane. This result surprised many experts and has since led to further developments in the field.

Her study of quadratic forms also led her to investigate real algebraic geometry as well as complex algebraic geometry and the cohomology theories that are linked to it. Parimala has put this expertise to work in a series of elegant publications either supporting or refuting long-standing conjectures. Her study of low rank quadratic spaces, for example, led her to a new definition of discriminant that is an invariant for involutions of central simple algebras that allowed her to settle decomposability questions for involutions that date back to Albert in the 1930s.

Parimala has also brought light to the solution for the second Serre conjecture, expounded in 1962 but based on work by Witt around 1930. In another piece of work that has been described as a "tour-de- force", Raman has come closest to solving another long-standing conjecture. In the 1950s, it was predicted that the u-invariant of the rational function field over a p-adic field is finite and, in fact, equals 8. Until recently, even the finiteness of the u-invariant was not known, until demonstrated by Merkurjev. Van Geel- Hoffmann then calculated a value of around 22 for the u-invariant. Together with Suresh, Parimala has shown that the u-invariant of the function field of any curve over a p-adic field is less than or equal to 10, very close to the conjectured value of 8.

Support from her family for her contribution towards mathematics:

. India has always had a fascination for Mathematics. From Bhaskaracharya to Srinivasa Ramanujam, Indian mathematicians have made vital contributions to this field. In this long line of eminent math wizards, proudly stands Parimala Raman, a mathematician known globally for her contribution in the field of algebra. She spoke to The Better India about her early influences, challenges, and gave a message to those students who wish to pursue a career in math.

The Seeds of Love for a Subject Are Sown Early

“I owe it to my wonderful teachers in Sarada Vidyalaya, Chennai, who taught me math well and got me attracted to it,” begins Parimala. Parimala’s early years were spent in Chennai where she completed her schooling and went to Stella Maris College for Women. Parimala shares that during her college days, Professor Thangamani was of great help to her, and influenced her career choice. During her time at Stella Maris College, there was a brief period where Parimala contemplated taking up Sanskrit poetry but numbers had truly taken over her heart. “Math has the beauty of poetry,” she says. Being a scholar in the Mathematical arena is not the default career option that most families understand. Parimala credits her parents with supporting her and letting her find her own space. Parimala says, “I had such enlightened parents who encouraged me to do whatever I excelled in to the best possible manner.

Support from her father

Parimala's father was an English Professor who guided her through her choice of a research institution, while her mother was the rock of support during Parimala's entire career. With the solid backing of her family, Parimala took up her research work at the Ramanujan Institute for Advanced Studies in Mathematics. There she met a couple of mentors who would guide her in higher math. She says, "I also must mention the mathematicians at the Ramanujan Institute, particularly Professor Bhanumurthy and Professor Rema for the encouragement and support during the initial year of my research."

Support of her husband

Parimala credits her husband, Raman, for helping her in the pursuit of her passion for Math post marriage. After their wedding, Parimala who was a professor at the Tata Institute of Fundamental Research, took leave for a year and accompanied husband to Dares-Salaam. Raman worked as the Chief Internal Auditor with the Board of Internal Trade, Tanzania. "I had no clear plan for my career. In a few months, Raman took an extraordinary decision. He quit his job to accompany me to E.T.H. Zurich so that I could do post-doctoral work." It was this critical decision that helped Parimala get back to research and mathematics."But for his support, I would have given up my career at some point. More than support, his enthusiasm for the research I do and rejoicing when I get recognition were steering forces for me to continue to this date in the profession. He is immensely proud of me," smiles Parimala honors on National Science Day in 2020, Smriti Irani, head of the Ministry of Women and Child Development of the Government of India, announced the establishment of chairs at institutes across India in the names of Raman Parimala and other ten Indian women scientists.[8] Parimala was an invited speaker at the International Congress of Mathematicians in Zurich in 1994 and gave a talk Study of quadratic forms — some connections with geometry Archived 3 October 2016 at the Wayback Machine. She gave a plenary address Arithmetic of linear algebraic groups over two dimensional fields at the Congress in Hyderabad in 2010.

Fellow of the Indian Academy of Sciences [1]

Fellow of Indian National Science Academy [1]

Bhatnagar Award in 1987[1]

Honorary doctorate from the University of Lausanne in 1999[1]

Srinivasa Ramanujan Birth Centenary Award in 2003.[1]

TWAS Prize for Mathematics (2005).[1][9]

Fellow of the American Mathematical Society (2012) [10]

Vedic Mathematics

Introduction:

Dhivya Nair R S
(III B. Sc Mathematics)

Vedic Mathematics is an ancient system of calculation which comprises a collection of techniques and sutras to solve mathematical problems in an easy and faster way. It includes 16 Sutras which are formulae and 13 sub-Sutras which are sub-Formulae. Vedic Mathematics sutras can be applied to solve any problems involving arithmetic, geometry, algebra, conics, and calculus. Vedic Mathematics has been proved to be beneficial for students and anyone practicing maths in saving time, increasing concentration power, expanding brain power, and memorizing.

History of Vedic Maths:

Bharati Krishna Tirtha was born in March 1884 in Puri Village, Orissa, a state in India. Apart from mathematics, he also excelled in Science, Humanities, and Sanskrit as a student. He was passionate about meditation and spiritualism. He claims to have gained knowledge of the Vedic Sutras while meditating in a forest near Singeri for eight years. According to Krishna Tirtha, he learned the sutras from the Vedas, like the Atharva Veda and the Rig Veda.

Hence the term 'Vedic Mathematics'. He wrote the initial 16 sutras in 1957. He planned to pen more down, but cataract developed in both eyes, and he passed away in 1960.

Vedic Math Sutras:

The list of Sutras and Subsutras are tabulated below.

S NO	Sutras	Sub-Sutras
1.	Ekadhiken Purvena	Anurupyena
2.	Nikhilam Navatacharamam Dasatah	Sisyate Sesajnah
3.	Urdhva-tiryagbhyam	Adyamadyenantya-mantyena
4.	Paravartya Yojayet	Kevalaih Saptakam Gunyat
5.	Sunyma Samyasamuchaye	Vestanam

6.	(Anurupye) Sunyamanyat	Yavadunam Tavadunam
7.	Sankalana-vyavakalamnabyam	Yavadunam Tavadunikrtya Varganca Yojayet
8.	Puranapuranabhyam	Antyayoradaskaepi
9.	Chalana-Kalanabhyam	Antyayoreva
10.	Yavadunam	Samuccayagunitha
11.	Vyastisamastih	Lopanasthapanabhyam
12.	Sesanyankena Caramena	Vilokanam
13.	Sopantyadvayamantyam	Gunitasamuccayah Samuccayagunitah
14.	Ekanyunena Purvena	
15.	Gunitasamuccayah	
16.	Gunakasamuccayah	

Why Should You Know Vedic Math?

Vedic maths provides answers in one line, as opposed to the several steps of traditional mathematics. There are six Vedanganas. The Jyotish Shastra is one of the six. Vedic Math forms part of this Jyotish Shastra. Vedic maths consists of 3 segments or ‘skandas’ (branches). The beauty of Vedic Math lies in its simplicity; all calculations can be done on pen and paper. The approach to solve problems stimulates and sharpens the mind, memory, and focus. It improves creativity and promotes innovation.Vedic Maths is elementary and can be comprehended easily. Once a student begins to understand the basic concepts, they can get creative with their approach

Applications of Vedic Math:

Vedic Math is an ancient technique that simplifies multiplication, divisibility, complex numbers, squaring, cubing, square roots, cube roots, recurring decimals, and auxiliary fractions.

Vedic Maths has the following benefits:

- Makes elementary calculation 10-15 times faster.
- Helps in accurate guessing.
- Useful for all classes.
- Reduces burden (need to learn tables up to 9 only).
- A magical tool to reduce finger counting and rough work.
- Increases concentration.
- Helps in reducing silly mistakes.

Summary:

Vedic mathematics is a gift of Krishna Tirtha; it is a collection of invaluable techniques that can profoundly improve our speed, understanding, and performance in mathematics and other sciences. Vedic Maths is not getting its due importance; it is a fantastic method. Vedic Math is a great technique to master calculations, being more efficient and accurate. Practicing vedic math for 30 to 45 minutes a day will do wonders for anyone looking to better their abilities. Enhance your mental calculation.

ICT in Teaching and Learning

Mythili J
(III B.Sc Mathematics)

Introduction:

Information and Communication Technology (ICT) in education is the mode of education that use. Information and communications technology to support, enhance, and Information optimise the delivery of Information. Worldwide research has shown that ICT can lead to an improved student learning and better teaching methods. "We need technology in every classroom and in every student and teacher's hand, because it is the pen and paper of our time, and it is the lens through which we experience much of our world". Information and Communications technology (ICT) can impact student learning when teachers are digitally literate and understand how to integrate it into curriculum.

Definition of ICT

According to UNESCO (2002), "ICT refers to forms of technologies that are used to create, store, share or transmit, exchange information. ICT includes radio, television, video, DVD, telephone (fixed line & mobile), satellite systems, computer and network hardware and software".

Objectives of ICT In Education

- To make the teaching learning process easier.
- To develop the skills in both students and teachers.
- To enhance the thinking process of students.
- To make the teaching learning process enjoyable.
- To promote education at all levels.
- To provide equal opportunities to all type of learners.

Components of ICT for Teaching and Learning Video conferencing:

It is a two-way communication system. It is also called teleconferencing, it's the use of television video and sound technology (webcam) between people in different locations. It can be used to give and receive lectures irrespective of the location of teachers or learners.

World Wide Web:

The World Wide Web, known as www, w3 or simply the web, is one of the several internet resources developed to help, publish, organize and provide access to information on the Internet. The web was first developed by Tim Berners Lee I 1989 while working at CERN, European Particle Physics Laboratory in Switzerland.

Web 2.0:

The term was coined by Tim O‟ Reilly at the O‟ Reilly Media. Web2.0 describes World Wide Web sites that use technology beyond the static pages of earlier web sites. Although web2.0 suggest new version of www, it does not refer to update to any technical specification, but rather to cumulative changes in the way web pages are designed and used. It allows users to interact, collaborate and chat with each other both synchronously and asynchronously. Social Media, Blogs, Wikis, Video sharing are all based on Web2.0 Technology. With web2.0 tools, users can communicate around the world at a nominal cost. It allows population to correspond and spread ideas with each other rather than receiving the information from a single source.

Blog and Wikis:

Blogs and wikis are fundamentally web2.0 and their global proliferation have enormous implication for libraries and also in teaching and learning process. Blogs may indeed be a greater milestone in the history of publishing than web pages. They enable the rapid production and consumption of web-based publications. Blogs contains posts some time similar to Magazine entries, from a person or a group. The post is dated and listed in reverse chronological order. People can comment on posts as well as provide links to related sites, photos and blogs. Wiki is an online collaborative writing tool. According to (Richardson, 2006) a wiki is a collaborative web space where anyone can add content and anyone can edit content.

Social Media:

Social media are perhaps the most promising and embracing technology. They enable messaging, blogging streaming media and tagging. Some most commonly used social media are Myspace. Facebook, Delicious, Frappe and Flickr networks that have enjoyed massive popularity in web 2.0. It is based on web2.0 technology. Myspace and Face book enable users to communicate with each other, Del.icio.us enables users to share web resources and Flickr enables the sharing of pictures. Frappr is a bit of a blended network, using maps, chat rooms and pictures to connect individual.

Uses of ICT In Education

ICT increases participation between teacher and student. It helps the teachers to design various activities for students and thus improves the involvement of students in a classroom activity. ICT makes the teaching-learning process easier. With the help of this technology, students can access information from anywhere and anytime. Students can easily share their content with each other. Teachers can also create and share their content with the students and other teachers. ICT has made it possible for teachers to interact with the students in different ways. Students can prepare their notes easily by using the various resources available on the internet. Various softwares such as Microsoft word, Evernote etc help students to make their notes in the digital format. Students can easily manage and organise their notes by using these software programmes.

Develop Creative Skills

Students' creative skills can be developed with the help of this technology. They can develop various programmes with the help of various ICT tools. In other words, it makes students innovative.

Improve Teaching Skills

Teachers can improve their teaching skills by using this technology. It helps the teachers to design workbooks, assignments, and e-books for students. Teachers can also prepare interactive presentations for students.

Helps in Evaluation and Assessment

ICT tools are useful for teachers in evaluating and assessing students' performance. Various softwares help the teachers in keeping track of their students' performance. So, with the help of these techniques, teachers can quickly share feedback to students and parents.

Up-To-Date Content

Students get access to new and up-to-date content and material through internet and various online educational resources. So, ICT is useful for students in proving new information and broaden their knowledge.

Make Students More Engaged in Studies

ICT makes students more engaged in their studies. When a teacher presents the content of the subject with illustrations, flow charts and diagrams, the interest of students in that particular subject increases.

Increase Productivity of Students

ICT helps to increase the productivity of students. They can finish their homework and assignments on time and can use the extra time for other activities.

Promote Mainstreaming

ICT promotes mainstreaming by providing equal opportunities to all the learners whether disabled or non-disabled in a classroom. Various ICT tools and techniques are used to teach disabled learners so that they can easily adjust in the classroom

ICT Tools in Education

Computers are one of the important Information Technology Tools used in various educational fields. They are used to make presentations, projects, worksheets etc. Computers can be used to run several useful software or program which makes them a great ICT tool. Computers help students to access online classes, educational softwares which tend to improve their learning. A tablet is an intermediate device between a smartphone and a computer. They are typically around 9 to 10 inches. Students and teachers can use them for video conferences, presentations, and live classes. They are easy to carry owing to their light weight.

Interactive Whiteboard

The market of interactive whiteboard is growing day by day. It is in high demand by the educational institutions. It is also known as smart board. It can be a standalone device used to perform various tasks. Teaching through whiteboard makes it easier for students to understand the topics. Whiteboard can be easily connected to the internet, allowing teachers to easily explain topics to children through diagrams, flow charts, and animations.

Educational Software

Educational softwares serves as a useful Information Communication Technology (ICT) tool. Educational software is used to improve student's learning capabilities. Educational softwares simplifies the concept and make it easy to understand. These softwares provide online learning which makes education accessible anytime and increases the learning experience of the students.

Online Learning Platform

Online learning platforms are playing major role as Information Communication Technology (ICT) tools in the field of education. With the help of these programs, it becomes easier for students to understand the topics. These programs help make the learning exciting and interesting for children in many ways like providing online material, quizzes, interactive lessons, multimedia content etc. Any person of any age can acquire education in any subject at home without any difficulty.

Virtual Reality and Augmented Reality

Virtual reality and augmented reality can be one of the best Information Communication Technology (ICT) tools. It helps to increase the understanding of students. VR helps students to increase their understanding of difficult subjects. Boring subjects can be made interesting and fun to learn with the use of Virtual reality and Augmented reality. Augmented reality help students to access multimedia, computer-based simulations and animations to enhance their learning experiences.

E-reader

E-readers are very useful Information Communication Technology (ICT) tools in the field of education. Students can access a wide range of textbooks and other educational materials with the help of E-readers. They are portable, cheap and easy to use which makes them accessible for wide range of learners.

Cloud Storage

Students, teachers, and educational institutions can store, access, and share files and documents from anywhere with an Internet connection. There is no need of physical storage infrastructure for storing large amount of data. This we can say these tools provide a diverse range of interactive learning experiences for students.

Advantages of ICT In Teaching and Learning

- Access to Information: ICT provides easy access to vast amounts of information, enhancing students' learning resources.
- Interactive Learning: Digital tools enable interactive and engaging learning experiences, promoting active participation.
- Global Connectivity: ICT facilitates collaboration and communication beyond physical boundaries, connecting students globally.
- Multimedia Learning: Incorporating multimedia elements in teaching aids better understanding through visuals, audio, and interactive content.
- Personalized Learning: Adaptive technologies allow tailoring educational content to individual learning styles and paces.

Disadvantages of ICT In Teaching and Learning:

- Access Disparities: Unequal access to technology can create a digital divide, disadvantaging students without proper resources.
- Distractions: Digital devices can be a source of distractions, diverting students' attention from the educational content.
- Dependence on Technology: Overreliance on ICT may hinder the development of traditional academic skills and critical thinking.
- Security Concerns: The use of technology in education raises concerns about data security, privacy, and the potential for cyber threats.
- Initial Costs and Maintenance: Implementing and maintaining ICT infrastructure can be expensive, especially for underfunded educational institutions.

Conclusion

The intervention of information and communication technology is redefining the way students learn. It is making the process of learning more efficient and effective for students and teachers. ICT tools in education make it easier for teachers to use the best strategies to bring out the best in their students. ICT in education sector is beneficial for the students, in addition to this, it is making it possible for schools to impart education in the finest way.

In conclusion, ICT in education has revolutionized how we learn and teach. It empowers students with unparalleled access to resources, fosters interactive and collaborative learning experiences, and equips educators with tools to enhance their teaching. However, to fully harness the potential of ICT in education, it is vital to address issues of accessibility and digital literacy, ensuring that no student is left behind in the digital age.

National Mathematics Day ~ Dec 22nd

The Indian government declared 22 December to be celebrated as National Mathematics Day every year to mark the birth anniversary of the Indian mathematician Srinivasa Ramanujan. It was introduced by Prime Minister Manmohan Singh on 26 December 2011 at Madras University, to mark the 125th birth anniversary of the Indian mathematician Srinivasa Ramanujan. On this occasion Prime minister Manmohan Singh also announced that 2012 would be celebrated as the National Mathematics Year. Since then, India's National Mathematics Day is celebrated on 22 December every year with numerous educational events held at schools and universities throughout the country.In 2017, the day's significance was enhanced by the opening of the Ramanujan Math Park in Kuppam, in Chittoor, Andhra Pradesh. National Mathematics Day is celebrated in all schools and universities throughout the country. It's a day to recognize and appreciate the contributions of mathematicians and promote the importance of mathematics in various fields.

Srinivasa Ramanujan made significant contributions to number theory, mathematical analysis, infinite series, and continued fractions. National Mathematics Day in India aims to inspire interest in mathematics and commemorate Ramanujan's extraordinary achievements in the field. Events, seminars, and educational activities are often organized to celebrate the day and highlight the beauty and relevance of mathematics. The day pays tribute to Srinivasa Ramanujan's exceptional self-taught mathematical prowess. Ramanujan, with minimal formal training, made substantial contributions to mathematical research, leaving an enduring impact on the field. National Mathematics Day serves as a reminder of the importance of nurturing and supporting mathematical talent, regardless of background, and encourages a broader understanding and engagement with mathematics in society.

National Mathematics Day provides an opportunity to reflect on the global significance of mathematics as a universal language in solving real-world problems. It promotes the idea that mathematics is not only a tool for academic pursuits but also an integral part of our daily lives, influencing various aspects of science, technology, finance, and more. Celebrations often include showcasing the beauty of mathematical patterns, theorems, and applications to inspire curiosity and learning.

A Journey Through the History of Mathematics

Introduction:

Sugasini.P.L
(III B.Sc Mathematics)

The history of mathematics is a fascinating and intricate tale that spans millennia, with its roots deeply embedded in the evolution of human thought and the quest for understanding the fundamental principles that govern the universe. This journey takes us through ancient civilizations, the Islamic Golden Age, the Renaissance, and the modern era, showcasing the remarkable achievements and contributions of individuals who shaped the mathematical landscape.

Ancient Mathematics:

The origins of mathematics can be traced back to ancient civilizations, where rudimentary forms of arithmetic and geometry were developed for practical purposes such as commerce, construction, and astronomy. The ancient Egyptians, for example, utilized mathematics in the construction of the pyramids, employing geometric principles to achieve remarkable architectural precision. In Mesopotamia, the Babylonians developed a sophisticated system of mathematics, including the earliest known trigonometry, to solve practical problems related to land measurement and commerce.

Greek Mathematics:

The ancient Greeks made profound contributions to the theoretical foundations of mathematics. Pythagoras, with his famous theorem relating the sides of a right-angled triangle, laid the groundwork for the development of geometry. Euclid's "Elements," a comprehensive compilation of mathematical knowledge, served as a textbook for centuries and greatly influenced the study of geometry and number theory. Archimedes, renowned for his contributions to calculus, leveraged mathematical principles to address problems in physics and engineering.

Islamic Golden Age:

During the Islamic Golden Age (8th to 14th centuries), scholars in the Islamic world made significant advancements in mathematics. Al-Khwarizmi, often referred to as the "father of algebra," developed systematic methods for solving equations and laid the groundwork for algebraic manipulation. Mathematicians like Omar Khayyam made significant contributions to algebra and geometry, while Nasir al-Din al-Tusi pioneered trigonometry and introduced the concept of a function.

The Renaissance and Beyond:

The Renaissance witnessed a revival of interest in ancient Greek mathematics, with scholars like Leonardo da Vinci and Galileo Galilei incorporating mathematical principles into their work. The era also saw the development of new mathematical techniques, including the invention of logarithms by John Napier and the foundation of calculus by Sir Isaac Newton and Gottfried Wilhelm Leibniz in the 17th century.

The Birth of Modern Mathematics:

The 17th century marked the transition to modern mathematics. René Descartes pioneered the use of algebraic symbols for unknowns, laying the groundwork for analytical geometry. Sir Isaac Newton and Gottfried Wilhelm Leibniz independently developed calculus, a revolutionary mathematical tool for understanding change and motion.

19th and 20th Centuries:

The 19th century witnessed the formalization of mathematical rigor and the exploration of new branches, such as abstract algebra and non-Euclidean geometry. The 20th century brought the advent of computer science and the development of groundbreaking mathematical theories like set theory and topology.

Modern Mathematics:

The 19th and 20th centuries marked a period of tremendous growth and diversification in mathematics. The emergence of non-Euclidean geometries, set theory, and abstract algebra revolutionized the field. Mathematicians such as Georg Cantor, David Hilbert, and Emmy Noether played pivotal roles in shaping modern mathematical thought. The advent of computers in the 20th century further transformed the landscape, giving rise to computational mathematics and the exploration of complex mathematical structures.

Conclusion:

The history of mathematics is a rich tapestry woven with the threads of human ingenuity and intellectual curiosity. From ancient civilizations to the cutting-edge research of the present day, mathematics has been an essential tool for understanding the world and solving complex problems. The journey through the history of mathematics not only reveals the evolution of mathematical ideas but also underscores the profound impact mathematics has had on shaping the course of human history.

Women in Mathematics

M. Mathumitha
(II B.Sc Mathematics)

There are many women known for their contributions to mathematics. The woman in mathematics that I chose was Suzan Rosa Benedict. Suzan was born in Norwalk, Ohio in 1873. She received her B.A. degree in 1895 from Smith College with a major in chemistry and a minor in mathematics, German, and physics. Suzan taught high school mathematics in Norwalk from 1895 to 1905 while also working as a real estate agent. She then entered Columbia University, receiving her master's degree in the history of mathematics in 1906. In the same year she started teaching mathematics at Smith College and where she remained for the rest of her professional career. Suzan continued her graduate studies while teaching, and in 1914 she became the first woman to receive a PhD in mathematics from the University of Michigan. At Smith College Suzan continued her research in the history of mathematics, publishing papers in the Mathematics Teacher the American Mathematical Monthly. Through her efforts the Smith College library developed a large collection of rare books on the history of mathematics. She was promoted to the rank of Professor in 1921. Benedict was also a charter member of the Mathematical Association of America, founded in 1915.

Benedict retired from Smith in February, 1942.She died from a heart attack two months later. Her friendliness was not confined to the College. To her an acquaintance was a friend and people of all sorts and conditions in the town felt that they knew her and will miss her.

Help Your Child with Math Anxiety

A.P Athira
(II B.Sc Mathematics)

Local Math experts share tips on helping kids handle Maths anxiety. Avoid rote memorising & memory overload, Instead, teach kids to figure things out.

For example, if they can't remember what 9x7 is, they can do 10x7, which is easier to remember, then subtract 7 to get the same answer. Guide kids towards deeper understanding. This is known as metacognition.

Some questions to ask:

- How do you know that your answer is correct?
- What is a quick way to arrive at the correct answer?
- Why did you choose this method?

Build a good basic foundation It is important that kids learn the basics correctly.

For example, naming fractions. Some kids say 'two upon three' instead of 'two-thirds' (the correct way). When the basics are not learnt well, more complex questions can be stressful.

Healthy body, healthy mind: Research shows that physical exercise increases blood flow and connectivity in the hippocampus, a key region in the brain for memory formation and consolidation of learning. Maintaining a healthy body and positive mind is important.

Speed Math!

S.S. Varsha
(I B.Sc Mathematics)

As the name suggests, Speed Math teaches techniques to solve mathematical problems, even complex ones, at near lightning speeds. However, it is about speed, accuracy, and simplicity.

Speed Math offers simple steps that are easy to understand and remember, and erase the need for rote memorization of math facts. Speed Math is based on Vedic Mathematics and the Trachtenberg System of Mathematics. Vedic Mathematics is based on a book written by the Indian monk Bharati Krishna Tirtha ji Maharaj, which was first published in 1965.

In it, the author lists mathematical techniques, which he claims to have originated in the Vedas, and describes it as a system of mental calculation. The Trachtenberg System of Mathematics was developed by the Russian engineer Jakow Trachtenberg.

Speed Mathematics: Secret Skills for Quick Calculation by Bill Handley.

Example 1:

- Take an example such as 7 x 8. Through traditional multiplication methods a child has three options when solving this question:
- Add seven 8's (ie 8 + 8 + 8 + 8 + 8 + 8 + 8)
- have memorised their 7 or 8 times tables
- Used a combination of these methods (ie 5 x 8 = 40 plus two more 8's to give you 56).

Example 2:

- Multiply by 10, then remove that number once for 9
- When multiplying by 9, you need to multiply by 10 and then remove that number once. It's one of the easier multiplication tricks for 9 and can be done quite quickly.
- E.g., 9 X 67 is 670 – 67, which is 603.

Example 3:

- Add a 0, divide by 2 multiply by 5 tricks
- One of the easy multiplication tips for a number, is that of 5. Simply add a 0 to the end of the number, and then divide the whole thing by 2.
- E.g., 5 X 37 is 370 divided by 2, which is 185.
- 5 X 88 is 880 divided by 2, which is 440.

Example 4:

- Multiplying a number by 11, use this cool trick.
- When you're multiplying a number by 11, then you can separate that number and add their sum in the middle.
- E.g., 33 X 11 is 3 (3+3) 3, which is 363.

Pythagorean Chronicles

G. Aswatha
(I B.Sc Mathematics)

Pythagoreanism originated in the 6th century BC, based on and around the teachings and beliefs held by Pythagoras and his followers, the Pythagoreans. Pythagoras established the first Pythagorean community in the ancient Greek colony of Kroton, in modern Calabria (Italy).

The Pythagorean theorem: The sum of the areas of the two squares on the legs (a and b) equals the area of the square on the hypotenuse (c). According to a popular legend, after he discovered this theorem, Pythagoras sacrificed an ox, or possibly even a whole hecatomb, to the gods. He started a group of mathematicians, called the Pythagoreans, who worshiped numbers and lived like monks. He had an influence on Plato. He had a great impact on mathematics, theory of music and astronomy.

The Pythagoras theorem, also known as the Pythagorean theorem, states that the square of the length of the hypotenuse is equal to the sum of squares of the lengths of other two sides of the right-angled triangle. Or, the sum of the squares of the two legs of a right triangle is equal to the square of its hypotenuse. The theorem has been known in many cultures, by many names, for many years. Pythagoras, for whom the theorem is named, lived in ancient Greece, 2500 years ago. It is believed that he learned the theorem during his studies in Egypt. The Egyptians probably knew of the relationship for a thousand years before Pythagoras. Another name for Pythagoras theorem is "Baudhayana theorem ". Pythagoras is best known in the modern day for the Pythagorean Theorem, a mathematical formula which states that the square of the hypotenuse of a right triangle is equal to the sum of the squares on the other two sides. Pythagoras is most famous for his theorem to do with right triangles. He said that the length of the longest side of the right-angled triangle called the hypotenuse (C) squared would equal the sum of the other sides squared. And so, $a^2 + b^2 = c^2$ was born. There are many different proofs for this Pythagorean theorem.

Pythagoras was a secretive and mysterious man. Nevertheless, he was an important philosopher, mathematician, and mystic in ancient Greece. His followers, the Pythagoreans, were one of the oldest secret societies in the world and studied the sciences, math, art, and philosophy.

Math Riddle

K.S. Archana
(I B.Sc Mathematics)

1. How do you go from 98 to 720 using just one letter?
   Math riddle 1
   Answer: Add an "x" between "ninety" and "eight". Ninety x Eight = 720
2. A merchant can place 8 large boxes or 10 small boxes into a carton for shipping. In one shipment, he sent a total of 96 boxes. If there are more large boxes than small boxes, how many cartons did he ship?
   Answer: 11 cartons total
   7 large boxes (7 * 8 = 56 boxes)
   4 small boxes (4 10 = 40 boxes
   11 total cartons and 96 boxes
3. Can you write down eight eights so that they add up to one thousand?
   Answer: 888 + 88 + 8 + 8 + 8 = 1000
4. If two's company and three's a crowd, what are four and five?
   Answer: Nine
5. Which weighs more- 16 one-ounce or 2 half-pound bars of chocolate?
   Math-riddle-5.jpg
   Answer: Neither, they weigh the same.
6. A duck was given $9, a spider was given $36, and a bee was given $27. Based on this information, how much money would be given to a cat?
   Answer: $18 ($4.50 per leg)
7. How do you make the number 7 even without addition, subtraction, multiplication, or division?
   Answer: Drop the "S"
8. A family has five sons, and each of them has a sister. How many kids does a family have in total?
   Answer: The family has six kids – five sons have one common sister.
9. Write down the next number in the pattern: 2, 3, 5, 8, 13…
   Answer: 21
10. When my dad was 31, I was just 8 years old. Now his age is twice as old as my age. What is my present age?
    Answer: When you calculate the difference between the ages, you can see that it is 23 years. So, you must be 23 years old now.
11. What number do you get when you multiply all of the numbers on a telephone's number pad?
    Answer: Zero, because any number multiplied by 0 will always equal 0.
12. If you take 3 apples from 5. How many do you have?
    Answer: You take 3, so you have 3
13. I am more than 10 but less than 14. I am one more than the number of months in one

year. What am I?
Answer: 13

14. I add five to nine and get two. The answer is correct but how?
    Answer: When it is 9 am, add 5 hours to it and you will get 2 pm.
15. Two fathers and two sons go fishing. Each of them catches one fish. So why do they bring home only three fish?
    Answer: Because the fishing group comprises a grandfather, his son, and his son's son – hence just three people.
16. Am a number, but when you add the letter G to me, I go away. What number am I?
    Answer: Add G, and it becomes GONE.
17. If a rooster laid 13 eggs and the farmer took eight of them and then another rooster laid 12 eggs and four of them were rotten, how many of the eggs were left?
    Answer: Roosters don't lay eggs!
18. What can you put between 7 and 8 to get a result bigger than 7, but not quite as high as 8?
    Answer: A decimal point is the answer. Your score would be 7.8, which is in the middle of the range of 7 to 8.

Geometry

R.A. Rathishma
(I B.Sc Mathematics)

Geometry is the branch of mathematics that deals with shapes, angles, dimensions and sizes of a variety of things we see in everyday life. Geometry is derived from Ancient Greek words – 'Geo' means 'Earth' and 'metron' means 'measurement'. In Euclidean geometry, there are two-dimensional shapes and three-dimensional shapes.

In a plane geometry, 2D shapes such as triangles, squares, rectangles, circles are also called flat shapes. In solid geometry, 3D shapes such as a cube, cuboid, cone, etc. are also called solids. The basic geometry is based on points, lines and planes explained in coordinate geometry. The different types of shapes in geometry help us to understand the shapes day to day life. With the help of geometric concepts, we can calculate the area, perimeter and volume of shapes.

Geometry Definition

Geometry is the study of different types of shapes, figures and sizes in Maths or in real life. In geometry, we learn about different angles, transformations and similarities in the figures. The basics of geometry depend on majorly point, line, angles and plane. All the geometrical shapes are based on these basic geometrical concepts.

Branches of Geometry

Algebraic Geometry: It is a branch of geometry studying zeros of the multivariate polynomial. It includes linear and polynomial algebraic equations that are used for solving the sets of zeros. The application of this type comprises Cryptography, string theory, etc.

Discrete Geometry: It is concerned with the relative position of simple geometric objects, such as points, lines, triangles, circles etc.

Differential Geometry: It uses techniques of algebra and calculus for problem-solving. The various problems include general relativity in physics etc.

Euclidean Geometry: The study of plane and solid figures based on axioms and theorems including points, lines, planes, angles, congruence, similarity, solid figures. It has a wide range of applications in Computer Science, Modern Mathematics problem solving, Crystallography

Convex Geometry: It includes convex shapes in Euclidean space using techniques of real analysis. It has application in optimization and functional analysis in number theory.

Topology: It is concerned with the properties of space under continuous mapping. Its application includes consideration of compactness, completeness, continuity, filters, function spaces, grills, clusters and bunches, hyperspace topologies, initial and final structures, metric spaces, nets, proximal continuity, proximity spaces, separation axioms, and uniform spaces.

Plane Geometry (Two-dimensional Geometry): Plane Geometry deals with flat shapes which can be drawn on a piece of paper. These include lines, circles & triangles of two dimensions. Plane geometry is also known as two-dimensional geometry.

Logic

Anandhi. R
(I B.Sc Mathematics)

Mathematical logic (i.e., symbolic logic) uses symbols to represent relationships between the elements of an argument and uses rules to draw inferences about those elements. The main branches of mathematical logic are set theory, model theory, recursion (computability) theory, and proof theory. Logical/mathematical intelligence refers to our ability to think logically, reason, and identify connections. People with mathematical intelligence, such as Albert Einstein, are good at working with numbers, complex and abstract ideas, and scientific investigations.

Mathematical logic is used in the development of SAT and SMT (satisfiability modulo theories) solvers. Such solvers are used to solve NP-complete problems, especially in engineering applications. In addition, mathematical logic is used in formal verification, and automated reasoning for various problems. While "logic" may simply refer to valid reasoning in everyday life, it is also one of the oldest and most foundational branches of mathematics, often blurring the boundaries between mathematics and philosophy. Logic is the study of Truth and how we can obtain universal Truths trough mathematical deduction. Mathematical logic, also known as symbolic logic or by the technical name "lower predicate calculus" is a first order language upon which is based mathematical proof.

Mathematicians use logic all the time to prove theorems and other mathematical facts. Everything we know about math right now is based off of these logical proofs. Without these, we wouldn't have our formulas, like the wonderful quadratic formula or the very useful Pythagorean Theorem

In the second half of the last century, logic as pursued by mathematicians gradually branched into four main areas: model theory, computability theory (or recursion theory), set theory, and proof theory. Aristotelian logic focuses on reasoning in the form of syllogisms. It was considered the main system of logic in the Western world until it was replaced by modern formal logic, which has its roots in the work of late 19th-century mathematicians such as Gottlob Frege. Today, the most used system is classical logic.

Ancient Egyptian Mathematics

R.R. Manju Pashini
(I B.Sc Mathematics)

Throughout its history, humanity has developed numerous methods of multiplication or repeated addition. These can be more or less time-consuming and also vary in effectiveness: while some are better for education, others pursue purely practical purposes. Three such methods are traditional, Ancient Egyptian, and the method of cups and counters. Each of them has its pros, cons, and application: the first is better for comprehending the principle of multiplication in the decimal system, the second – for practical purposes, and the third – for education.

The traditional or long multiplication method is one of the most famous and widely accepted in the world. This method goes back to medieval Italian mathematics and relies on the decimal system as its main underlying concept. This algorithm amounts to multiplying ones, tens, hundreds, etc. of one factor by the ones, tens, hundreds, etc. of another factor, thus reducing any problem to several one-digit multiplications. The method is similar to cups and counters in the sense that it also relies on the decimal system, but different from the Ancient Egyptian one, which relies on binaries. The pros of this method are its easy operability once mastered and the availability of different strategies to simplify it while learning, such as writing the factors on different paper pieces for convenience (Anu & Vinod, 2016). On the negative side, it requires an understanding of the decimal system and knowledge of multiplication tables before one can proceed. Its best use is for multiplying large numbers in writing.

Ancient Egyptian is another method quite different from long multiplication. As the name suggests, it comes from Ancient Egypt historically, and its central underlying concept is binary arithmetic. Ancient Egyptian multiplication relies on extensive use of multiplication tables for different numbers structured by the binary principle. Since Ancient Egyptian hieroglyphic writing was ill-suited for written calculation, the primary purpose of this method was to reduce the calculation to a sequence of steps that could be carried out mentally (Imhausen, 2018).

Cryptography

P.R. Harani
(I B.Sc Mathematics)

Cryptography is technique of securing information and communications through use of codes so that only those people for whom the information is intended can understand it and process it. Thus, preventing unauthorized access to information. The prefix "crypt" means "hidden" and suffix "graphy" means "writing". In Cryptography the techniques which are used to protect information are obtained from mathematical concepts and a set of rule-based calculations known as algorithms to convert messages in ways that make it hard to decode it.

Techniques used For Cryptography: In today's age of computers cryptography is often associated with the process where an ordinary plain text is converted to cipher text which is the text made such that intended receiver of the text can only decode it and hence this process is known as encryption. The process of conversion of cipher text to plain text this is known as decryption.

Confidentiality: Information can only be accessed by the person for whom it is intended and no other person except him can access it.

Integrity: Information cannot be modified in storage or transition between sender and intended receiver without any addition to information being detected.

Symmetric Key Cryptography: It is an encryption system where the sender and receiver of message use a single common key to encrypt and decrypt messages. Symmetric Key Systems are faster and simpler but the problem is that sender and receiver have to somehow exchange key in a secure manner. The most popular symmetric key cryptography system is Data Encryption System (DES) and Advanced Encryption System (AES).

Types of Cryptography:

Symmetric Key Cryptography: It is an encryption system where the sender and receiver of message use a single common key to encrypt and decrypt messages. Symmetric Key Systems are faster and simpler but the problem is that sender and receiver have to somehow exchange key in a secure manner. The most popular symmetric key cryptography system is Data Encryption System (DES) and Advanced Encryption System (AES).

Hash Functions: There is no usage of any key in this algorithm. A hash value with fixed length is calculated as per the plain text which makes it impossible for contents of plain text to be recovered. Many operating systems use hash functions to encrypt passwords.

Electronic signatures: Electronic signatures serve as the digital equivalent of a handwritten signature and are used to sign documents. Digital signatures are created using cryptography and can be validated using public key cryptography. In many nations, electronic signatures are enforceable by law, and their use is expanding quickly.

Authentication: Cryptography is used for authentication in many different situations, such as when accessing a bank account, logging into a computer, or using a secure network.

0!

Keerthana.C. K
(I B.Sc Mathematics)

Maths - an incredible tale of numbers full of thrilling combinations, engrossing ideas, and musing questions. I believe Maths is gripping because it reveals its cards when they are least expected. A few days back, I came to know the story of 0!.

This may not sound very tempting to Maths wizards reading this but believe me, I was totally in love with Maths once again with this simple yet not so simple question. So, this exclamation looking symbol is a Mathematical operation factorial which means to multiply a series of descending natural numbers.

For example, 4! = 4*3*2*1=24

Now we take it as a fact that 0! = 1 but what's funny is that how can we decrease a number till 1 which is already less than 1. So, to decode this cipher let us all do a mental exercise. So let's calculate what is 5!, 4!, 3!, 2!, 1!

So, 5! = 5*4*3*2*1 =120

4! = 4*3*2*1 = 24

3! = 3*2*1 = 6

2! = 2*1 = 2

1! = 1 and now if we look closely 4! is nothing but 5!/5 and 3! is 4!/4.

Going on 2! = 3!/3 and 1!=2!/2 and leaping one step forward we can get 0! that is 1! /1 and yes it results in 1.

Isn't it baffling that multiplying no numbers together results in 1? But this is how Maths is. Beautiful.

Game Theory

Sabinisha. S
(I B.Sc Mathematics)

Game theory, branch of applied mathematics that provides tools for analysing situations in which parties, called players, make decisions that are interdependent. This interdependence causes each player to consider the other player's possible decisions, or strategies, in formulating strategy. A solution to a game describes the optimal decisions of the players, who may have similar, opposed, or mixed interests, and the outcomes that may result from these decisions.

Classification of Games: Games can be classified according to certain significant features, the most obvious of which is the number of players. Thus, a game can be designated as being a one-person, two-person, or n-person (with n greater than two) game, with games in each category having their own distinctive features. In addition, a player need not be an individual; it may be a nation, a corporation, or a team comprising many people with shared interests. In games of perfect information, such as chess, each player knows everything about the game at all times. Poker, on the other hand, is an example of a game of imperfect information because players do not know all of their opponents' cards. • The extent to which the goals of the players coincide or conflict is another basis for classifying games. Constant-sum games are games of total conflict, which are also called games of pure competition. Poker, for example, is a constant-sum game because the combined wealth of the players remains constant, though its distribution shifts in the course of play. • Players in constant-sum games have completely opposed interests, whereas in variable-sum games they may all be winners or losers. In a labour-management dispute, for example, the two parties certainly have some conflicting interests, but both will benefit if a strike is averted.

One-Person Games: One-person games are also known as games against nature. With no opponents, the player only needs to list available options and then choose the optimal outcome. When chance is involved the game might seem to be more complicated, but in principle the decision is still relatively simple. For example, a person deciding whether to carry an umbrella weighs the costs and benefits of carrying or not carrying it. While this person may make the wrong decision, there does not exist a conscious opponent. That is, nature is presumed to be completely indifferent to the player's decision, and the person can base his decision on simple probabilities. One-person games hold little interest for game theorists.

Two-Person Constant-Sum Games Games of Perfect Information: The simplest game of any real theoretical interest is a two-person constant-sum game of perfect information. Examples of such games include chess, checkers, and the Japanese game of go. In 1912 the German mathematician Ernst Zermelo proved that such games are strictly determined; by making use of all available information, the players can deduce strategies that are optimal, which makes the outcome preordained (strictly determined). In chess, for example, exactly one of three outcomes mustoccur if the players make optimal choices: (1) White wins (has a strategy that wins against any strategy of Black); (2) Black wins; or (3) White and Black draw. In principle, a sufficiently powerful supercomputer could determine which of the three outcomes will occur. However, considering that there are some 1043 distinct 40-move games of chess possible, there seems no possibility that such a computer will be developed now or in the foreseeable future. Therefore, while chess is of only minor interest in game theory, it is likely to remain a game of enduring intellectual interest.

Games of Imperfect Information: A “saddlepoint” in a two-person constant-sum game is the outcome that rational players would choose. (Its name derives from its being the minimum of a row that is also the maximum of a column in a payoff matrix—to be illustrated shortly—which corresponds to the shape of a saddle.) A saddlepoint always exists in games of perfect information but may or may not exist in games of imperfect information. By choosing a strategy associated with this outcome, each player obtains an amount at least equal to his payoff at that outcome, no matter what the other player does. This payoff is called the value of the game; as in perfect-information games, it is preordained by the players’ choices of strategies associated with the saddlepoint, making such games strictly determined.

Conclusions and Future Research: Game theory is useful for creating a precise mathematical model linking strategy combinations to payoffs, a kind of periodic table of the elements of social life. Predictions are made using various behavioral assumptions about how deeply people reason and how they react to observed behavior. Hundreds of experiments suggest that players do not always reason very strategically, evaluation of payoffs often includes social elements beyond pure self-interest, and players learn from experience.

Mathematical puzzles

Bavani.K
(I B.Sc Mathematics)

1. Set A = (1,3,5,7------------297,299 -150 odd numbers). How many ways are there to choose exactly 18 numbers from set A such that their sum is 191?

Solution & Explanation:

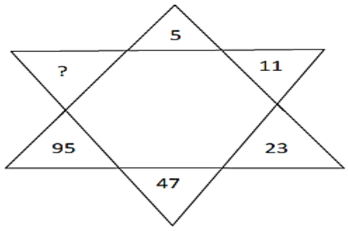
0 number of ways is the answer because the sum of 18 odd numbers can never be odd.

2. Vivek, a chain smoker, one day found it extremely difficult to go out to the market to get some cigarettes. He had some cigarette butts with him and he could pull tobacco out of some butts. 5 butts of tobacco make a cigarette. He collected the tobacco and made the cigarettes from the 121 butts available with him. How many cigarettes would he be able to smoke?

Solution & Explanation

120/5 = 24 cigarettes and from (24 + 1) cigarettes, 25/5= 5 cigarettes, and then 5/5 = 1 cigarette. Thus, total number of cigarettes, he can roll = 24+5+1 = 30 cigarettes.

3. Find the missing number:
A. 189
B. 191
C. 3
D. 255



Solution & Explanation

We have: 5x2+1=11, 11x2+1=23, 23x2+1=47, 47x2+1=95.
So, missing number = 95x2+1=191.

4. In a faulty watch, the minute and the hour hand of a watch meet every 64 minutes. How much does the watch loss or gain time?

Solution & Explanation

The watch gains [65(5/11) - 64] = 1(5/11) minutes because the minute and hour hand meet after every 65(5/11) minutes.

Origin and Subsequent Development of Calculus

N. Sabitha
(I B.Sc Mathematics)

The aim of this research is to review the origin and subsequent development of calculus over the years through the analysis of two great mathematicians; Isaac Newton of England and Leibniz Gottfried of Germany. It's clear that calculus served as the quantitative language of science for more than three hundred years and these two were credited with transforming the powerful tool of their thinking into mathematics. We define the four development of calculus as integral, differential, mathematical and modern, and how various methods were invented by geometers influenced the development of calculus. Two properties can be distinguished; derivative and infinitesimal.

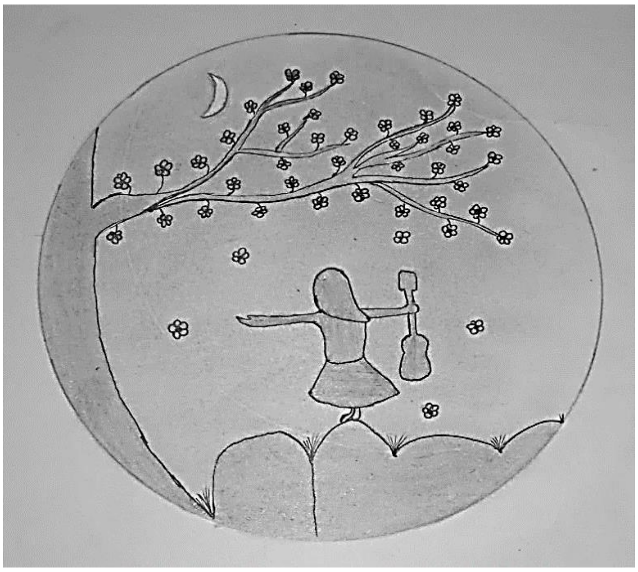
Greek mathematicians separated algebra and geometry. The Cartesian coordinates and modern symbolism are what gave Isaac Newton and Leibniz Gottfried insights into creating calculus and our focus is how they used the Fundamental Theorem of Calculus into transforming people's theories into a powerful tool. Although calculus received numerous criticisms at the time of invention, mathematicians succeeded in putting calculus on a firm foundation. To understand their theorem, they clearly understood infinity. Though the applications interplay between discreetness and continuity, these two geometers have described discreet objects by continuous models and use the same applications for solving continuous problems.

The subsequent development of calculus is largely due to the ancient geometer's natural curiosity and their demands of application that provided solutions to mathematical problems. They confronted the problems of finding areas and volumes of various solids- a term referred to as integration; a phrase used throughout the paper. The outstanding work of the previous century's geometers such as the great Greek Democritus, the works of the Chinese mathematician Liu Hui and Archimedes, to name just a few brought together the techniques of solving calculus problems. Their resembling concepts of derivations and Integration can be recognized in the works of Fermat and Democritus on tangents and finding maxima and minima.

The mathematics we have today is owed to the great contributors of Indian Mathematicians and astronomers. By 500 AD, Aryabhata had introduced a notion of infinitesimals, based on basic differential calculus to solve integer equations that arose from his astronomical theories. Another Indian classic, Manjula, developed an equation in the 10th century that eventually led to the development of the 12th century Bhaskara II derivative concepts and Rolle's Theorem (Smith, 2007; Kartz, 1995)).

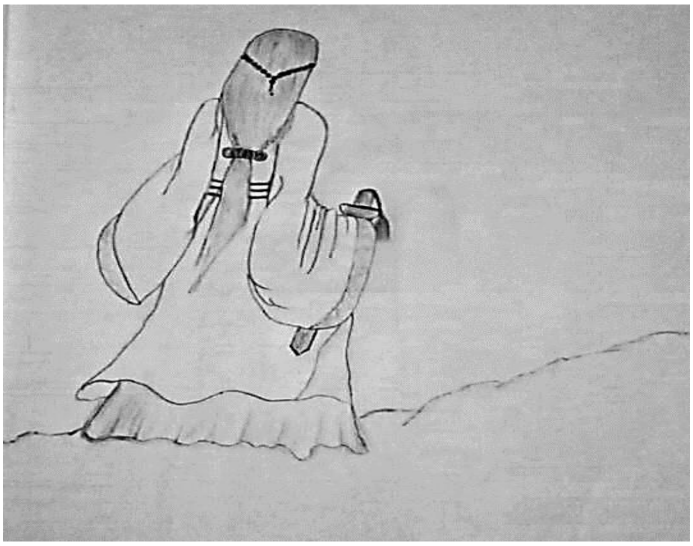
Athira. S

(III B.Sc Mathematics)



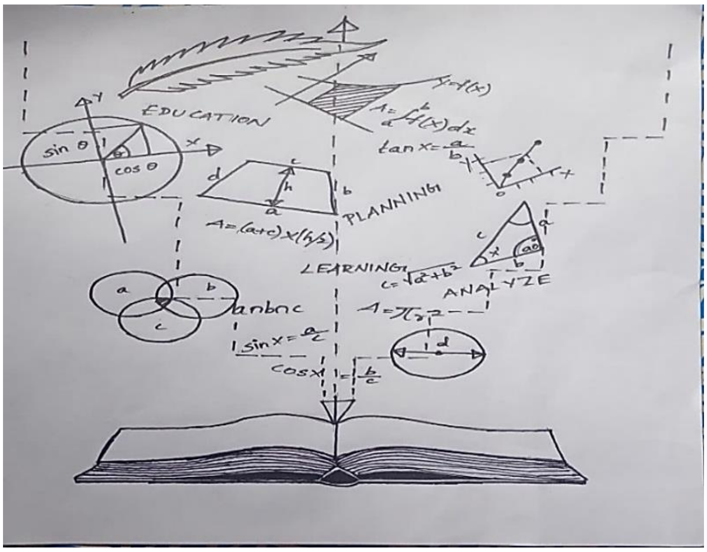
K. Bernisha

(III B.Sc Mathematics)



Mythili J

(III B.Sc Mathematics)



A.P. Athira

(II B.Sc Mathematics)

University Rank Holder

Aparna Shankar J L (B.Sc. – 19th Rank (2022))

Ph.D Awardees from Mathematics in the Year 2018-2023

Rajeshni Golda.J

Kavitha. S

Sheeba. R.S

Sreeji.S

Subha

H. Aswathy

S.Sarasree

Jesin Glanta P. J

Ganitholsav – 2023

Mathematics Association (2022-2023)

Mathematics Association (2023-2024)

Teacher's Day Celebration (2023)

Students Induction Programme

Fresher's Day (2023)

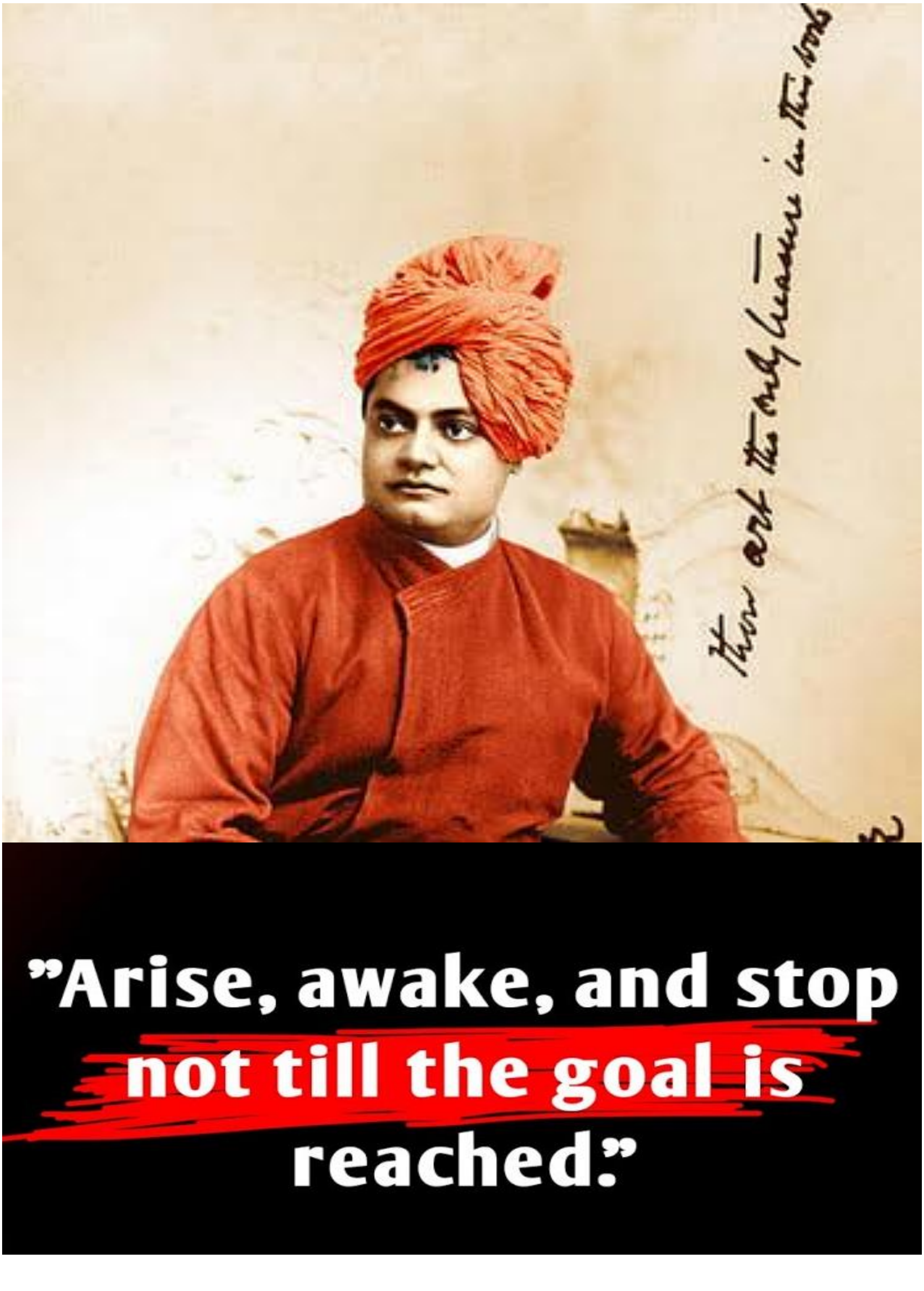
Extension Activities in Govt Primary School, Chunkankadai

Parents Teachers Meeting

Rangoli Competition


Mathe matics & Research Centre


"Arise, awake, and stop
not till the goal is
reached."