

APRIL 2024



NEWSLETTER

PALETTE-O-MATH




ISSUE 09



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NEWSLETTER

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"PRINCIPAL"

Dear Students and Faculty,
As we embark on a new phase of academic excellence, I am delighted to extend my warmest greetings to all members of the Department of Mathematics at Kalindi College. Mathematics, with its timeless beauty and universal language, holds the key to unlocking endless possibilities in the realms of science, technology, and innovation. Let us continue to embrace curiosity, creativity, and collaboration as we explore the depths of this fascinating discipline together. I commend the dedication and passion of our mathematics enthusiasts and look forward to witnessing their continued growth and achievements. My best wishes to the entire department for a successful publication.



Prof. Meena Charanda

"TEACHER-IN-CHARGE"

The objective of the Newsletter is to highlight the latest achievements in the world of Mathematics. A lot of hard work, initiative and dedication has made the Newsletter a reality. We are able to achieve Indian glory again and making new path for Vishwaguruu Bharat.

A great thanks to each and everyone for their contributions.
Also my deepest gratitude to our Principal Madam for blessings.



Dr. Abhishek Kr. Singh

"TEACHER EDITORS"

The release of our newsletter "Pallete-O-Maths", marks a new step in its vision to channelize the efforts and measures of the department towards academic excellence.

We feel immense pleasure and pride in conveying our best wishes to our Department of Mathematics for releasing the newsletter which is envisioned to share and display meaningful ideas based on Mathematics Education research, experiences from the field and problems & activities related to mathematics.

This would help in connecting teachers with the latest updates from the research and practice and also provide an opportunity to reflect and improvise their pedagogy.

We would like to thank our principal, Professor Meena Charanda, for her constant guidance. We appreciate the incessant hard work of faculty, students and all the contributors and thank them for the successful launch of newsletter.

It will surely enlighten the students in numerous activities that kept them going forward by bringing all details of numerous competitions.



**Mr. Sanjay Kumar
(Society Convener)**



Ms. Garima Gaur

STUDENT EDITORS



Ekta Pandey
IIIrd YEAR



Divyanka
IIInd YEAR



Aashvi Agarwal
IIInd YEAR



Reetika
IIInd YEAR

ALUMINI'S NOTE

The days I spent in Kalindi College were amazing. I was a student of B.SC. Mathematics. Now I am pursuing M.Sc Mathematics from NCWEB, University of Delhi. My time in college has been a rollercoaster of emotions - from the highs of academic achievements to the lows of late-night cramp sessions and exam stress. But through it all, I've grown not just in knowledge, but also in character. I've learned the value of perseverance, resilience, and teamwork. I've discovered my passion, honed my skills, and embraced my identity. All the curriculum activities, workshops and competitions helped me to shape my personality for my future. To my professors, mentors, and friends who have inspired and guided me along the way, I owe a debt of gratitude that can never be fully repaid. Thank you for believing in me, challenging me, and helping me become the best versions of myself.



HIMANSHI
BATCH 2020-2023

OFFICE BEARERS



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Riya
Technical Team



Ekta Pandey
3rd Year CR



Sakshi
2nd Year CR



Kanak Goyal
1st Year CR

ARTICLES

MATHS STUDIES MATTER : A proven Lemma

"Maths Matters" not only as a discipline of numbers and equations but as a potent catalyst for personal growth and self-development. This exploration delves into the transformative power of mathematical theorems, examining how these abstract principles shape not only our understanding of the world but also our capacity for critical thinking, problem-solving, and holistic self-improvement. Mathematical theorems, with their elegant structures and logical precision, captivate the imagination. Beyond their abstract nature, the beauty lies in their ability to instill a sense of order and understanding in the universe. As individuals engage with theorems, they embark on a journey that goes beyond mathematical abstraction, resonating with the human quest for knowledge and enlightenment.

The study of theorems necessitates logical reasoning—a skill that extends far beyond the boundaries of mathematics. Engaging with the rigorous proof structures of theorems cultivates critical thinking, encouraging individuals to analyze problems methodically, evaluate evidence, and draw sound conclusions. This capacity for logical reasoning becomes a cornerstone for self-development. Mathematical theorems are often born out of the need to solve complex problems. Applying this problem-solving mindset to personal challenges becomes a transformative process. Individuals learn to break down intricate issues, identify key components, and construct systematic solutions—a valuable skill set in the journey of self-improvement. Proving a mathematical theorem requires resilience and perseverance. The iterative process of grappling with concepts, facing setbacks, and persisting until a solution is reached instills a resilient mindset. This resilience becomes a guiding force in navigating life's uncertainties, teaching individuals to embrace challenges as opportunities for growth.

Engaging with mathematical theorems stimulates abstract thinking, fostering creativity in problem-solving. The ability to approach challenges from multiple perspectives, a skill honed through abstract mathematical reasoning, translates into creative expression in various aspects of life, from personal projects to professional endeavors. Mathematical theorems often involve quantitative analysis—a skill set invaluable in personal decision-making. Whether evaluating options, weighing pros and cons, or setting measurable goals, the quantitative perspective derived from mathematical theorems enhances the precision and effectiveness of personal choices.

"Maths Matters" not just for its numerical intricacies but for its profound role in sculpting a path of continuous self-discovery and enlightenment.

Dr. Tajender Kumar
Department Of
Mathematics



NATURE'S TRICKS TO SOLVE BIG PUZZLES

Imagine if we could solve challenging puzzles by learning from how nature works. This excellent idea is called Nature-Inspired Optimization (NIO), and it's like using nature's secret tricks to figure out complex problems. Just like animals and plants have their ways to survive and thrive, scientists use these ideas to make computer programs that can solve tough optimization problems.

For example, there are computer programs that work like a flock of birds moving together or ants finding the best path to food. These programs can help solve problems in Engineering Design, Robotics and Control Systems, Renewable Energy, Urban Planning, and even in Health Care.

What makes NIO special is that it's very flexible and smart. It can look for solutions in ways that are similar to how nature changes and adapts over time. This means it can often find better answers to problems than the usual methods.

By learning from nature, we are not just improving at solving problems. We are also reminded of how amazing nature is, with its smart and efficient ways of doing things. This mix of nature and technology is helping us find new solutions that are good for us. It's like opening a new door to a world where we solve problems by following nature's lead.

Mr. Manish Kumar
Department Of
Mathematics



VEDIC MATHEMATICS: TOOL FOR RAPID CALCULATIONS

Vedic Mathematics has its origin in the Vedas. The word Veda literally means the 'fountain head and illimitable storehouse of all knowledge.' Therefore, the Vedas contain all knowledge that is essential for mankind. Vedic mathematics is a collection of sixteen beautiful formulae from the Vedas, discovered by His Holiness, Jagadguru Sankaracharya Sri Bharati Krishna Tirthaji Maharaj. It is a gift to the world by Swamiji, who himself was a great scholar. The original source of Vedic mathematics is the Atharva Veda and

all the sutras and sub-sutras were rediscovered by Swamiji between 1911 and 1918.

Vedic mathematics is the name of the wind that has created revolutionary changes in fast calculations. It is a super-fast way of making all mathematical calculations easier and faster than the traditional one. Nowadays, it has become a must-learn tool for students who want to perform faster and flawless calculations in a few seconds. Vedic mathematics is an ancient technique consisting of 16 Sutras called Formulae and 13 sub-sutras called Sub Formulae, which simplifies not only the eight fundamental arithmetical operations,

but also handles algebraic concepts like simultaneous equation, but also handles algebraic concepts like simultaneous equation, simple equation, quadratic equation, factorization of cubic equations etc., more effectively than the traditional approach. Apart from this, Vedic mathematics works faster in areas of Trigonometry, Coordinate Geometry and Calculus, in the same effective manner.

Let us understand one of Vedic Mathematics sutra called Ekadhikena Purvena which means One more than the Previous. This method is used to Square of Numbers which ends with 5.

Square of Such Numbers = (Number before 5) x (next number) (Left Side) / 25 (Right Side).

For example:

The number before 5 is 2, and the number next to 2 is 3, therefore
 $= 2 \times 3 / 25 = 625$.

What is ?

The number before 5 is 6, and the number next to 6 is 7, therefore
 $= 6 \times 7 / 25 = 4225$.



Mr. Hari Kishan Bhardwaj
Department of Mathematics

MATHEMATICS IN MUSIC

"There is geometry in the humming of the strings and there is music in the spacing of spheres" - Pythagoras.

Mathematics and music share a profound and intricate relationship, with mathematical principles underlying various aspects of musical composition, performance, and appreciation. From the structure of musical scales to the rhythms of melodies, mathematics plays a fundamental role in shaping the art and science of music. One of the most prominent connections between mathematics and music is found in the realm of harmony and melody. Musical scales, such as the major and minor scales, are based on mathematical intervals and ratios.

For example, the octave—the interval between two pitches with a frequency ratio of 2:1—is a fundamental concept in music theory. Additionally, other intervals, such as the perfect fifth and perfect fourth, are based on simple integer ratios, which create harmonious and consonant sounds. The relationships between the pitches within a chord are governed by mathematical principles, including ratios and intervals. For instance, the ratios of frequencies between the notes of a major chord are in the ratios 4:5:6, producing a consonant and pleasing sound. In addition to harmony, mathematics also influences the rhythm and timing of musical compositions. Musical notation, which represents the duration and timing of notes, is based on

mathematical symbols and conventions. Time signatures, tempo markings, and rhythmic patterns are all expressed using mathematical notation, enabling musicians to interpret and perform musical compositions accurately. Beyond composition, mathematics also plays a role in music performance and analysis. Musicians use mathematical principles, such as counting rhythms and calculating tempos, to interpret and perform musical scores effectively. Additionally, music theorists and analysts employ mathematical tools, such as Fourier analysis and set theory, to analyze the harmonic and structural elements of musical compositions. In summary, mathematics permeates every aspect of music, from its fundamental elements of pitch

and rhythm to its complex structures and compositions. The relationship between mathematics and music is not merely theoretical but practical, shaping the way musicians compose, perform, and analyze music. By understanding the mathematical principles underlying music, we gain deeper insight into the beauty and complexity of this universal art form.

Nistha Vij
3rd year
B.Sc (Hons.)
Maths



DISCRETE MATHEMATICS IN REAL WORLD

WHAT IS DISCRETE MATHEMATICS?

Discrete mathematics is the study of mathematical structures that are countable or otherwise distinct and separable. Examples of structures that are discrete are COMBINATIONS, GRAPHS, and LOGICAL STATEMENTS. Discrete structures can be finite or infinite. Discrete mathematics is in contrast to continuous mathematics, which deals with structures which can range in value over the REAL NUMBERS, or have some non-separable quality. Discrete means separate, distinct, or distinguishable. Discrete math is applied to our day to day life activities as well. Discrete math is considered the contrast of continuous math. Combinatorial topics such as Ramsey Theory, Combinatorial Set Theory, Matroid Theory, Extremal Graph Theory, Combinatorial Geometry and Discrepancy Theory are related to a large part of the mathematical and scientific world, and these topics have already found numerous applications in other fields.

Everyday applications of Discrete Mathematics.

Discrete Mathematics is a rapidly growing and increasingly used area of mathematics, with many practical and relevant applications.

□ COMPUTERS

Computer runs software and stores files. The software and files are both stored as huge strings of 1s and 0s. These strings are called the BINARY STRINGS. This Binary Math is Discrete Mathematics.

□ NETWORKS

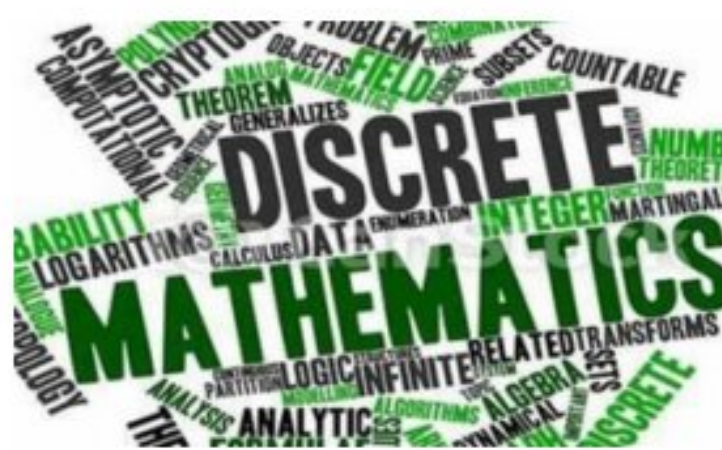
Networks are, at base, Discrete Structures. The routers that run the internet are connected by long cables. People are connected to each other by social media ("following" on Twitter/X, "friending" on Facebook, etc.). The US highway system connects cities with roads. So basically Discrete Mathematics play an important role in Networking.

□ CRYPTOGRAPHY

Discrete Mathematics is essential in cyber security, and cryptography is based entirely on it. Cryptography is the study of how to create security structures and passwords for computers and other electronic systems. It uses encryption and decryption to disguise data.

DISCRETE MATHEMATICS IS USED IN CRYPTOGRAPHY FOR A FEW REASONS:

1. **NUMBER THEORY:** This is one of the most important concepts of discrete math. It allows mathematicians to generate and break numerical passwords. Cryptographic Protocols use discrete math to secure data and communications. This ensures that sensitive information remains confidential and protected from unauthorized access.



Discrete mathematics can be used to:

1. Scheduling games for professional sports league, here a part of discrete mathematics namely, Graph Theory is used.
2. Determine the sizes and teeth needed for correct timekeeping in an analog clock.
3. Design a computer network using the least amount of cable.
4. Digital image processing, uses discrete mathematics to merge images or apply filters.

Discrete mathematics is a very vast topic whose uses can be as simple as calculating the probability of a coin flip or as complex as helping in the medical field with surgery or other such difficult tasks.

Discrete Mathematics helps us make sense of data or structures which may otherwise seem random and help us draw useful conclusions from them.

Aashvi Agarwal
2nd year
B.Sc (Hons)
Maths



PI IN INDIAN MATHEMATICS

Pi (π) is a mathematical constant that has fascinated mathematicians, scientists, and enthusiasts for centuries. Represented by the Greek letter π , it is defined as the ratio of the circumference of a circle to its diameter and is approximately equal to 3.14159. In this article, we will delve into the significance, history, and applications of this remarkable number. Pi (π) holds a profound significance in the history of Indian mathematics.

Ancient Indian Contributions The origins of Pi in Indian maths can be traced back to ancient texts such as the "Sulba Sutras," which date back to around 800 BCE to 500 BCE. These texts, associated with Vedic traditions, contain geometric rules for constructing altars and fireplaces, implicitly referring to the concept of Pi through approximations. For instance, one Sulba Sutra mentions the ratio of the diagonal of a square to its side, providing an approximation close to Pi.

Aryabhatta and Early Approximations Aryabhatta, a pioneering mathematician and astronomer from the 5th century CE, contributed significantly to the understanding of Pi. In his work "Aryabhatiya," he used an approximation of Pi as $62832/20000$, which equals approx 3.1416. This approximation was remarkably accurate for its time and laid the groundwork for further exploration of Pi's properties.

Bhaskara II and Refinements Bhaskara II, a mathematician from the 12th century CE, further refined the approximation of Pi. He employed iterative methods to obtain closer approximations of Pi and developed formulas for calculating the circumference of a circle based on its diameter. Bhaskara II's contributions marked a significant advancement in the accurate calculation of Pi in Indian maths.

Conclusion

As we continue to explore the mysteries of Pi, we acknowledge the profound legacy of Indian mathematics and its invaluable contributions to the world of mathematics and science.

Divyanka
2nd year
B.Sc (Hons) Maths



MAGIC SQUARES

In recreational mathematics, a square array of numbers(positive integers), is called a magic square if the sums of the numbers in each row, each column, and both main diagonals are the same.

·The 'order' of the magic square is the number of integers along one side (n)

· The constant sum is called the 'magic constant'.

· Classical magic square

A magic square of order n is said to be Classical magic square if it contains numbers exactly from $1, 2, 3, \dots, n^2$. Classical magic square of all orders there than 2 can be formed .

Example: Classical magic square of order 3 is-

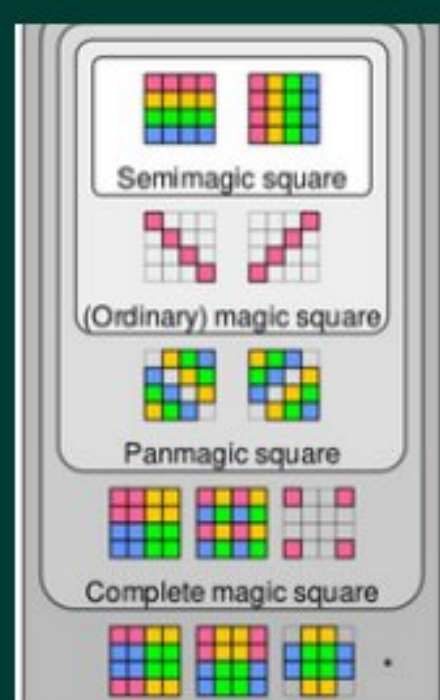
2	7	6
9	5	1
4	3	8

This is also known as Lo shu grid.

It is a Chinese magic square with magic constant 15.

·**Ortho Magic Squares / Semi Magic Square**

When all rows and columns but not both main diagonals sums magic constant , then it is said to be a Semi Magic Square.



Classification of Magic Squares by Euler Diagram:

For Example:

·Web search engines like Google use them to determine the significance of a web page for their search results.

·Replacing numbers with notes from the musical alphabet.

·The magic square is used as a substitution cipher text in cryptography. The method for encryption and decryption of information is proposed by constructing magic squares with the help of Narayana's folding method and Knight's move method.

Muskan Garg
3rd year
B.Sc (Hons)
Maths



THE POWER OF ALGORITHMS: How Math Drives Modern Technology

In the dazzling world of IT, beneath the flashy interfaces and sleek devices, lies a hidden master conductor: **"MATHEMATICS"**.

It's the silent magician weaving algorithms into AI models, crafting communication protocols for the internet and orchestrating the dance of data in quantum computers.

Algorithms, the building blocks of IT systems are crafted using mathematical principles. Whether it's sorting data, searching for information or optimizing processes, algorithms leverage mathematical structures for efficiency. In the realm of cybersecurity, mathematics stands guard as the ultimate protector.

Encryption algorithms use number theory and mathematical concepts to secure our data, creating an impregnable fortress against cyber-crimes. Delve into the world of cryptography, where prime numbers and modular arithmetic weave a cloak of invisibility around our

specific information. As we push the boundaries of computing, the quantum realm beckons.

Quantum computing with its promise of unprecedented processing power, relies on the principles of quantum mechanics, a branch of physics deeply entwined with advanced mathematics.



In the age of big data, mathematics takes the spotlight in data science. Statistical models, probability theory and machine learning algorithms form the bedrock of extracting valuable insights from vast datasets. From search engines and social media platforms to recommendation systems and autonomous vehicles, algorithms are the driving force into modern technology.

This saga isn't a static map, it's just passenger, it's the navigator, charting the course and propelling us past uncharted territories. Journey through the data-driven landscape witness how mathematical models transform raw data into actionable intelligence. So, next time when you explore the digital cosmos, remember :

**"Math isn't just a fuel;
It's the very soul of journey..."**

Reetika
2nd year
B.Sc. (Hons)
Maths



EDUCATING UNDERPRIVILEGED CHILDREN

“If you make the world better for kids, they’ll make the world better for everyone”.



India, a vast country where people from different ethnicities and backgrounds co-exist together to make it a beautiful place to live in and especially our achievements in recent times are surely leading us to a much brighter future ahead. However, one issue that still prevails even after so many years is of poverty, a large part of our society is still lacking behind amidst all the development happening. If we go and look at the ground reality, lack of Education is still a factor which hinders the growth of so many children, according to a report as of 2021, approximately 7.7% of the Indian population was multidimensionally poor and deprived in years of schooling. Introducing various government policies and regulation have helped in improving these statistics but as a part of the society it is our responsibility to help the ones in need.



A single person’s effort could help in breaking this cycle of poverty and create a meaningful difference in their lives, it is only by collective efforts and commitment every child would get their right to get education and get a chance to thrive so that even they can be an asset for the future of this nation.

Yashi Singh
2nd year
B.Sc (Hons) Maths



CRUNCHING NUMBERS, CRAFTING INTELLIGENCE: The Mathematical Symphony of AI



The fusion of Mathematics and AI is not a mere coincidence but a strategic Integration where Mathematical principles breathe life into intelligent systems .

Artificial Intelligence:

Artificial Intelligence is a wide ranging branch of computer science which is concerned with the building of smart machines capable of performing tasks that typically require human intelligence .

Artificial Intelligence (AI) stands at the forefront of technological advancements, transforming industries and reshaping our daily lives. Behind the scenes of this cutting-edge technology lies the backbone that empowers AI systems—mathematics. Key Mathematical Concepts which form the backbone of AI advancement:

Linear Algebra: The Pillar of AI:

At the heart of AI, linear algebra plays a pivotal role. Matrices and vectors are fundamental structures employed in representing and manipulating data. Operations like matrix multiplication enable efficient transformations and computations, essential in tasks such as image processing and deep learning.

Calculus: The Engine of Optimization:

Calculus, with its concepts of derivatives and integrals, provides the optimization engine for AI algorithms. Whether it’s fine-tuning parameters in machine learning models or optimizing neural network architectures, calculus helps AI systems achieve optimal performance by minimizing errors and maximizing efficiency.

Probability and Statistics: The Guardians of Uncertainty:

In the real world, uncertainty is inevitable. Probability theory and statistics equip AI with tools to understand and handle uncertainty in data. Bayesian inference, probability distributions, and statistical analysis play crucial roles in decision-making processes, making AI systems more adaptable and robust.

Number Theory:

Ensuring Data Security:

The security of AI systems is paramount, especially in applications like cryptography. Number theory, a branch of mathematics, plays a crucial role in ensuring the robustness of encryption algorithms, safeguarding sensitive information in AI-driven technology.

Conclusion:

In conclusion, the role of mathematics in AI extends beyond the mentioned branches, encompassing a rich tapestry of mathematical disciplines. Whether modeling dynamic systems, analyzing function spaces, or strategizing in complex scenarios, mathematics continuously provides the tools for AI to evolve, adapt, and excel in its diverse applications. While AI utilizes various mathematical concepts it does not eliminate the need for human mathematician. AI presents new opportunities to develop innovative solutions and push the boundaries of what is possible.

We summarize what we found, think about where things stand now, and consider where math and AI might go from here.

Smriti
2nd year
B.Sc (Hons) Maths



MACHINE LEARNING

The term machine learning was coined in 1959 by Arthur Samuel. Machine learning is a branch of artificial intelligence (AI) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy. Machine learning history starts in 1943 with the first mathematical model of neural networks presented in the scientific paper "A logical calculus of the ideas immanent in nervous activity" by Walter Pitts and Warren McCulloch. In 1950 Alan Turing created the Turing Test to determine if a computer has real intelligence. To pass the test, a computer must be able to fool a human into believing it is also human. He proposed the question, 'Can machines think?'

FEATURES OF MACHINE LEARNING

Machine learning can adapt to changes quickly whereas traditional methods can become less accurate over time. Machine learning is also more accessible than traditional methods. Traditional methods often require specialized knowledge and training. Machine learning can make predictions based on a much larger data set than traditional methods. Machine learning is a more efficient use of resources than traditional methods. Traditional methods require a lot of manual work, which can be time-consuming and expensive. Machine learning can identify patterns are too complex for humans to observe. Machine learning is not as biased by human emotions or subjective opinions

REAL LIFE APPLICATIONS

MEDICAL INDUSTRY:

Industry applies machine learning in predicting life spans and diagnosing certain diseases.

SOCIAL MEDIA PERSONALIZATION:

Machine Learning algorithms can analyse user behavior to provide personalized notifications, recommendations and content.

ONLINE FRAUD DETECTION:

Feed forward Neural network helps in differentiating between fraud and genuine transactions.



MAGIC OF MATHS IN MACHINE LEARNING

Machine learning is all about collecting data, we collect data from and perform various operations on the dataset like cleaning and processing the data, visualizing and predicting the output of the data. For all the operations we perform on data, there is one common foundation that helps us achieve all of this through computation-- and that is MATHEMATICS.

Jiya Yadav
2nd year
B.Sc.(Hons) Maths



THE HARMONIOUS DANCE OF MATHS AND ART

Throughout history, mathematics and art have shared a deep and intertwined relationship, often dancing together in a harmonious embrace. While on the surface they may seem like disparate fields, a closer look reveals the intricate connections that bind them together, enriching both disciplines in the process.

One of the most striking examples of this relationship can be found in the concept of the Golden Ratio, also known as Phi (ϕ). This mathematical ratio, approximately equal to 1.618, has been revered for centuries for its aesthetic appeal. It appears in countless works of art, from the architecture of the Parthenon to the composition of Renaissance paintings. Artists and architects have long recognized the innate beauty and harmony inherent in the Golden Ratio, utilizing it to create visually pleasing compositions that resonate with viewers on a subconscious level.

Moreover, mathematics provides artists with powerful tools for creating intricate patterns and designs. From the tessellations of M.C. Escher to the fractal geometry of Jackson Pollock, mathematical principles are often at the heart of artistic exploration. The use of algorithms and computer programming has opened up new frontiers in generative art, where complex forms and patterns emerge from simple mathematical rules. Conversely, art has also inspired mathematicians to explore new avenues of inquiry. The study of symmetry, for example, has been greatly influenced by the intricate patterns found in Islamic art and design. The collaboration between mathematicians and artists has given rise to fields such as mathematical art, where the boundaries between the two disciplines blur, resulting in breathtaking visualizations of abstract concepts.

Beyond their aesthetic appeal, mathematics and art share a common language of creativity and problem-solving. Both disciplines require imagination, intuition, and perseverance to push the boundaries of what is possible. Whether through the precise calculations of a mathematical proof or the fluid strokes of a painter's brush, both mathematicians and artists seek to capture the essence of truth and beauty in their work.

One of the most evident ways mathematics influences art is through geometry. Artists, architects, and designers have long use geometric principles to create visually appealing compositions. The ancient Greeks, for example, revered the golden ratio, a mathematical concept that defines a perfect proportion found in nature and aesthetics. This ratio has been employed in countless works of art, such as Leonardo da Vinci's "Vitruvian Man" and Michelangelo's "The Creation of Adam" on the Sistine Chapel ceiling.

In conclusion, the relationship between mathematics and art is a testament to the interconnectedness of seemingly distinct disciplines. From ancient masterpieces to modern digital creations, mathematics provides the framework that underlies the beauty and precision in art.

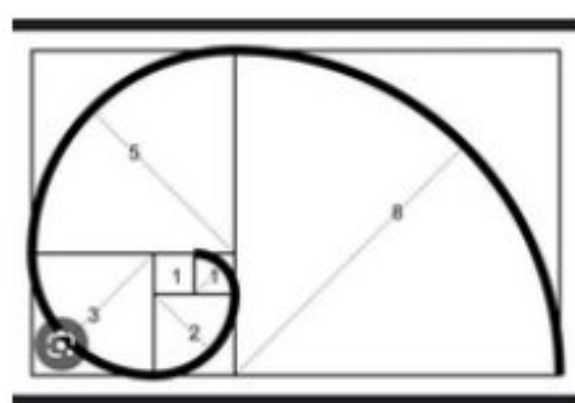
Anshika Gangwar
2nd year
B.Sc.(Hons)
Maths



FIBONACCI SEQUENCE & GOLDEN RATIO

The fibonacci sequence is a series of numbers where each number is the sum of the two preceding ones, usually starting with 0 and 1. These are the fixed numbers. This sequence goes on like 0,1,1,2,3,5,8,13,21,34,... and so on.

The Fibonacci sequence was first discovered by the Italian Mathematician, Leonardo Fibonacci in his book "Liber Abaci" in 1202. By taking an example of arrangement of petals on flowers, the number of petals in lily, buttercup, delphinium, corn marigold, aster, daisy are 3,5,8,13,21,34 respectively. This arrangement shows that Fibonacci sequence is present even in flowers too.



If these numbers are 'divided by the one before': $5/3$ is 1.66, $8/3$ is 1.60, $13/8$ is 1.62 and so on. The result approaches the golden ratio, which is approximately 1.6180. This property shows that the Fibonacci sequence is closely connected with the Golden ratio.

Golden Ratio is defined as the ratio of two quantities where the ratio of the sum of the quantities to the larger quantity is equal to the ratio of the larger quantity to the smaller one. This ratio emerges as a fundamental constant in mathematics and aesthetics.

Software engineers also use these numbers to find the applications in algorithms for optimizing search and sorting operations. In finance, for instance, Fibonacci retracement levels are used to predict potential price reversals in financial markets. Doctors also use it for the plastic surgery of the face. In fact, architects also work with this ratio to design buildings, and photographers to capture much better pictures.

A Fibonacci spiral is constructed by drawing circular arcs connecting the opposite corners of squares arranged according to Fibonacci numbers. It visually demonstrates the growth patterns found in nature such as arrangement of seeds in sunflowers or the spiral shells of mollusks.



These pictures help visualize the mathematical patterns and relationships inherent in the Fibonacci sequence and the Golden Ratio, providing insights into their applications in nature, art and even in the fields of science and mathematics.

In conclusion, the Fibonacci sequence and the golden ratio describes the beauty and elegance of mathematics. From the delicate spirals of a sunflower to the towering majesty of the Great Pyramid of Giza, their influence permeates every facet of our world, from the microscopic to the cosmic.

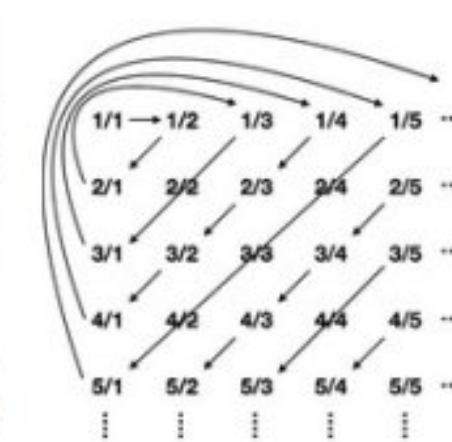
Geetali Bhatia
1st year
B.Sc.(Hons) Maths



THEORY OF INFINITY

Srinivasa Ramanujan was a self-taught Indian mathematician who made significant contributions to the field of mathematics, particularly in the area of number theory. One of his most famous theories is the theory of infinity, which explores the concept of infinity in a unique and profound way. Ramanujan's theory of infinity is based on his belief

that infinity is not just a concept or a mathematical construct, but a tangible and real entity that can be understood and explored through mathematical reasoning. He believed that infinity is not just a theoretical concept, but a fundamental aspect of the universe that can be observed and studied through mathematical principles. One of Ramanujan's most famous formulas is the infinite series for pi, the ratio of the circumference of a circle to its diameter. Ramanujan discovered a remarkable formula for calculating pi using an infinite series involving the square root of 2 and the gamma function. This formula has been used in the computation of pi to millions of decimal places and has been instrumental in the development of algorithms for calculating pi efficiently.



Ramanujan's work on infinite series also led to the development of the theory of modular forms, a branch of mathematics that has applications in number theory, algebraic geometry, and cryptography. Modular forms are complex functions that satisfy certain symmetry properties and have been used to study the distribution of prime numbers, the properties of elliptic curves, and the security of cryptographic algorithms. Overall, Ramanujan's theory of infinity had a profound impact on the field of mathematics and has inspired generations of mathematicians to explore the concept of infinity in new and innovative ways. His belief in the tangible and real nature of infinity has led to the development of new theories and algorithms that have revolutionized the way we understand and study the INFINITY.

Kanak Goyal
1st year
B.Sc.(Hons) Maths



EVENTS



NEO- FIESTA'23 (FRESHER'S WELCOME)

Anantata the Mathematics Society organised a fresher's party NEO-FIESTA'23 on 5th October, 2023. The event was a lively and successful event. Attendees enjoyed ice-breaking activities, cultural performances, a DJ session, and refreshments. Positive feedback was received, highlighting the event's role in fostering community and student integration. Followed by The Talent Show (Miss Fresher's Contest), there were 3 titles announced i.e., Miss Fresher, Miss Well dressed and Miss Talented

The winners are as follows:-
 Miss Fresher's - Kanak Goyal.
 Miss Well dressed - Vedika Verma.
 Miss Talented - Preeti.

PAPER PRESENTATION COMPETITION'24

The Mathematics society of Kalindi college organized Inter-College Paper Presentation competition on 23rd February, 2024. The competition was organized to enhance the research and analytical skills of the students in the respective specializations. The event was judged by Dr. Sunita Sharma (SRCC) and Dr. Tajender Kumar (KALINDI COLLEGE). Teams from various college participated in the competition and made the event a successful one.

The winners of the competition are as follows:
 1st Position - Jiya Yadav and Yashi Singh (Kalindi College)
 2nd Position - Shivani Sharma (Shaheed Bhagat Singh College)
 3rd Position - Khushboo Solanki (Kalindi College)
 Consolation Prize - Riya Sharma (Kalindi College)



PI DAY CELEBRATION (14 MARCH)

As part of an academic activity, ANANTATA, The Mathematics Society of Kalindi College, organized a lecture on "Overview of Cryptography: From Classical to Post Quantum" by Mr. Bharatendu Nandan (Scientist 'F', SAG, DRDO) on the occasion of "PI Day" on March 14th, 2024. Followed by few fun games such as Chess, Rubik's cube and reciting the highest value of Pi. Students from various department from the college participated in the games and the students were very engaged throughout the event, demonstrating their eagerness by asking questions and expressing their doubts.

TALENT CORNER



Chhavi Verma, 2nd year



Siyanshi, 1st year

Mansi Meshram, 2nd year



Aashvi Agarwal, 2nd year



Chhavi Verma, 2nd year



Aashvi Agarwal, 2nd year

इंतजार

हम इंतजार कर रहे हैं..
 किसी समय का.. किसी बात का.. या.. शायद.. किसी अनकहे जज़्बात का..
 ये जिंदगी की भाग दौड़ में कर भी यही सकते हैं..
 मेरा मतलब..
 इंतजार भी तो हिस्सा है न.. किसी खूबसूरत सी नई शुरुवात का..?
 हम इंतजार कर रहे हैं..
 किसी इंसान का.. उसकी याद का.. या शायद उससे मिला देनेवाली उस नूर भरी रात का?
 और इंतजार कर इसलिए रहे हैं.. क्योंकि उस इंसान को मिल पाने की खुशी ही तो जवाब है.. इंतजार में कटी उन सभी गहरी रात का..
 हम इंतजार कर रहे हैं..
 सुकून का.. प्यार का.. और जिंदगी से जो चाइए उन सभी ख्वाब का..
 क्योंकि ..
 कश्ती हमें खुद ही चलानी है.. और इंतजार ही रास्ता है..
 मेहनत से निकली मुश्किल के बाद मिलनेवाली.. उन खुशियों की सौगात का..
 कुछ देर ठहर कर.. थोड़ा इंतजार अगर कर लिया जाए..
 तो कई मामूली लम्हों की भी चमक बढ़ा देता है..
 और यही पूरा सार है कुछ देर रूक कर किए गए उस अंजाने इंतजार का.

:- श्रुति बिंदल
2nd year

यदि सब कुछ समान होता

यदि सब कुछ समान होता तो कैसा होता
 ना धरा पर मस्जिद, ना मन्दिर होता
 ना हिंदू होता, ना मुसलमान होता
 धरती पर जी रहा हर प्राणी बस एक इंसान होता।

कुछ सीखो, कुछ समझो,
 ना हिंदू बनो, ना मुसलमान बनो
 इंसानियत की खातिर, बस इंसान बनो।

ना गीता ना कुरान तुम्हे यह बताती है,
 की तुम हिंदू बनो या मुसलमान बनो,
 दोनो चीख- चीख कर यही सिखाती हैं
 इंसानियत की खातिर, बस इंसान बनो।

ना अल्लाह तुम्हें बताएंगे, ना कृष्ण तुम्हे संमझाएंगे,
 दोनों तुम्हें बस एक ही राह दिखाएंगे
 ना वो हिंदू का हाथ थामेंगे ना मुसलमान का
 वो तो बस अपने साथ इंसान लेकर जाएंगे।

इसलिए कुछ सीखो, कुछ समझो
 ना हिंदू बनो ना मुसलमान बनो
 इंसानियत की खातिर, बस इंसान बनो।।

:- निधि निमि
3rd year

कालिंदी कॉलेज में दो दिवसीय इंविटेशनल खेल प्रतियोगिता का हुआ आयोजन'



दो दिवसीय खेल प्रतियोगिता का आयोजन कालिंदी कॉलेज में हुआ। इसमें विद्यार्थियों ने अनेक खेलों में भाग लिया और बहुत सारे पुरस्कार जीते।



Meenakshi Yadav, 2nd year
B.Sc (Hons.) Mathematics

Achieved 1st Position in Inter College Boxing Championship



Smriti Kumari, 2nd year



Sapna Kumari, 2nd year

MEMORIES



CABINET 2023-24

