INFINITY INSIGHTS

"THE STUDY OF MATHEMATICS, LIKE THE NILE, BEGINS IN MINUTENESS BUT ENDS IN MAGNIFICENCE." - CHARLES CALEB COLTON

CONTENTS

EDITORIAL BOARD MEMBERS

National Mathematics Day

EVENT CORNER

INTER - DEPARTMENTAL COMPETITIONS

The **Department of Mathematics** of **Kongunadu Arts and Science College** organized Inter - Departmental Competitions for Students under DBT STAR College Scheme as a part of **National Mathematics Day Celebrations on 09.01.2024** with the motive of kindling their interest towards Mathematics and provide them a platform to exhibit their skill.

Exhibit your Creativity, Carve your Idea, Best Teacher, Shape the Formula and Coding Star competitions were conducted. 56 students from various Departments participated in this Inter-Departmental Competitions and exhibited their talent.

**Drawing by
one of the Participants**

**Coding framed by
one of the Participants**

**Enthusiastic Participants teaching
Mathematical Concepts in the 'Best Teacher' event**

INTER - SCHOOL COMPETITIONS

The Department of Mathematics of Kongunadu Arts and Science College organized Inter - School Competitions for School Students under DBT STAR College Scheme as a part of **National Mathematics Day Celebrations on 10.01.2024** with the motive of eradicating the fear of Mathematics among students and help them to learn Mathematics subject with more interest. **Dr. C.A. Vasuki**, Secretary and Director of the College inaugurated the event.

Inauguration of Chess Wizard event by Dr. C. A. Vasuki, Secretary and Director

Prize Distribution by Dr. M. Lekshmanaswamy, Principal

Dr. M. Lekeshmanaswamy, Principal of the college distributed the prizes to all the winners and gave the participation certificates to all the students.

'SRINIVASA RAMANUJAN ROLLING TROPHY' WAS BAGGED BY VIDHYA NIKETAN PUBLIC SCHOOL.

EVENT CORNER

Brain Teaser (Quiz), Manculator, Math Art, Sudoku Star, Formula Master, Chess Wizard, Math Model, Math Connection, War of Words and Master Mind competitions were conducted. More than **700 students** participated in this Inter-School Competitions and exhibited their talent.

Active Participation of the School Students in Various Events

Teachers, Parents and Students felt that the events were creative and highly informative. Faculty members of Department of Mathematics taught **Vedic Mathematics** to the school students.

DBT STAR College Scheme mainly aims to strengthen Science Education and Training among students. These competitions provided the platform for the students to explore their Mathematical skills and helped them to upgrade their knowledge

EVENT

CORNER

FDP ON COMPUTATIONAL MATHEMATICS

Using PYTHON & SCILAB

The Faculty Development Programme on Computational Mathematics Using PYTHON & SCILAB was jointly organised by **Department of Mathematics & Department of Computer Science (A),** KASC on **12.01.2024** in LAB-VI. The FDP received an overwhelming response with around 50 participants from various Colleges/ Universities.

The resource person **Dr. T. SENTHIL KUMAR**, Associate Professor, School of Computing, Amirtha Vishwa Vidhyapeetham, Coimbatore started the discussion with a brief introduction to PYTHON Programming and its wide scope of applications.

The afternoon session was Introduction to SCILAB and the resource person was **Dr. V.PARTHIBAN,** Assistant Professor of Mathematics, Vellore Institute of Technology, Chennai Campus. He introduced the participants to the new software and explained in details about its potential to do scientific calculations, data analysis and various tools available in the software for research. In his lecture, he taught how to solve linear equation, Matrix operations, Eigen values & Eigen vectors, data analysis using SCILAB.

The importance of this session is to encourage the faculty members to use the software which is free for scientific computing whenever MATLAB is not available.

EVENT CORNER

16th GRADUATION DAY

EVENT CORNER

Ms. S. Mythili, UG Rank holder, receiving her B.Sc., Mathematics Degree

Ms. R. Karthika, PG Rank holder, receiving her M.Sc., Mathematics degree.

The **16th Graduation Ceremony** of Kongunadu Arts and Science College for the 2019-2020 UG Batch and 2020-2021 PG Batch Students was held on **27.01.2024** at Dr. Marappa G Auditorium. **Dr. Dhriti Banerjee, Director & Country Head, Zoological Survey of India, Kolkata** served as a Resource person and presented the degree certificates to the Graduates.

The **First Rank holders** of the Department of Mathematics, **Ms. S. Mythili (191MA001)** and **Ms. R. Karthika (202MA013)** proudly received their degree certificates from the chief guest.

ALUMNI MEET' 2024

EVENT CORNER

On 27th January 2024, an **Alumni gathering** took place around 2.00 pm in the Department of Mathematics. 2019-2020 UG Batch and 2020 - 2021 PG Batch students recalled their memories and shared their current activities. Faculty members provided guidance and valuable inputs for shaping their future.

**2020-2021 Batch PG students lined up along with the faculty members**

Students of 2019-2019 UG Batch posing for a Group Picture with the faculty members.

ICCSPAM 2024

EVENT CORNER

The Department of Mathematics of Kongunadu Arts and Science College organized the **7th International Conference on Current Scenario in Pure and Applied Mathematics (ICCSPAM2024)** between 30 th and 31st **January, 2024** in online mode.

The Inaugural Session of the Conference was held on 30.01.2024 (Tuesday) at 10.00 IST. **Dr. V. Kokilavani, Assistant Professor and Head**, Department of Mathematics and Convener of this conference welcomed the gathering. **Dr. M. Lekeshmanaswamy**, **Principal** of the College delivered the Presidential Address. In his Presidential Address, he discussed the importance of Mathematics and its applications in various other fields. **Dr. S. Paulsamy, Dean R&D**, of our College offered the felicitation.
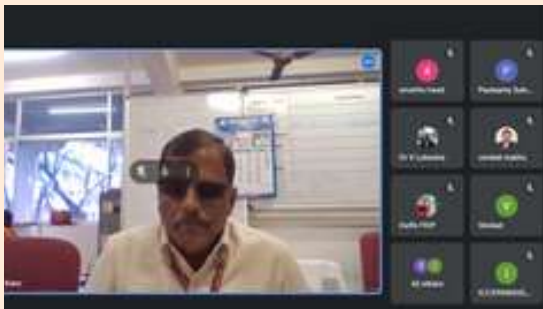

Dr. Dafik, Professor of Mathematics, Chairman, Combinatorics, Graph Theory and Network Topology, Research Group, University of Jember, Indonesia delivered the **Inaugural Address** in which he elaborated the role of Mathematicians in addressing the local issues. **Dr. V. Lokesha,** Department of Studies in Mathematics, Vijayanagara Sri Krishnadevaraya University, Ballari, Karnataka, delivered the **special address.** He congratulated the Department of Mathematics for consecutively organizing ICCSPAM for the 7th time and wished the participants to utilize such noble forums. Finally, **Dr. D. Vijayalakshmi,** Assistant Professor of Mathematics and Organizing secretary of this conference proposed the vote of thanks for the Inaugural Session.

Following the Inaugural Session, **Dr. Dafik,** Professor of Mathematics, University of Jember, Indonesia delivered lecture on the topic **'STGNNs for Multi - Step Time Series Forecasting on Precision'** in the Technical Session I. In his lecture, he discussed about the usage of smart sensors in collecting big data which is helpful in identifying various factors involved in farming. He also explained about Artificial Neural Network (ANN) and it's types.


In Technical Session II, **Prof. Dr. Raúl M. Falcón,** Professor of Mathematics, University of Seville, Spain delivered lecture on the topic **'The Hadamard Multiary quasigroup product'.** During his presentation, he explained all the basic concepts of quasi group which is currently an emerging field in the Research arena. He gave examples and illustrated appropriate applications.
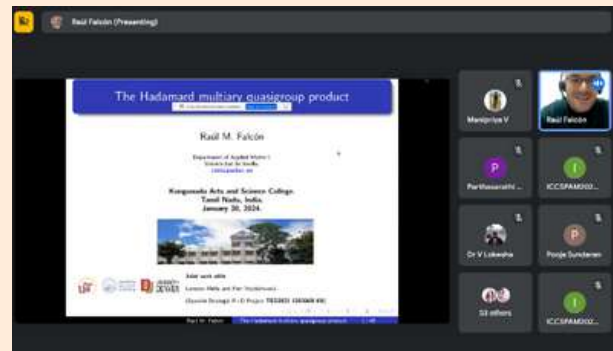
In Technical Session III, **Prof. Dr. Ismail Naci Cangul,** Department of Mathematics, Faculty of Arts and Science, Bursa Uludag University, Bursa, Turkey delivered his lecture on the topic **'On some new properties of omega invariant'**. In his lecture, he explained the omega invariant of a graph using the realizable degree sequence, the Cyclomatic number of a connected realization and problems related to realizable degree sequence.


EVENT CORNER

In Technical Session IV, **Dr. V. Lokesha,** Department of Studies in Mathematics, Vijayanagara Sri Krishnadevaraya University, Ballari, Karnataka delivered his lecture on the topic **'VL indices model broadening in one year and later'**. In his lecture, he discussed about the topological indices and each of their congruence. He further explained some of their physical properties
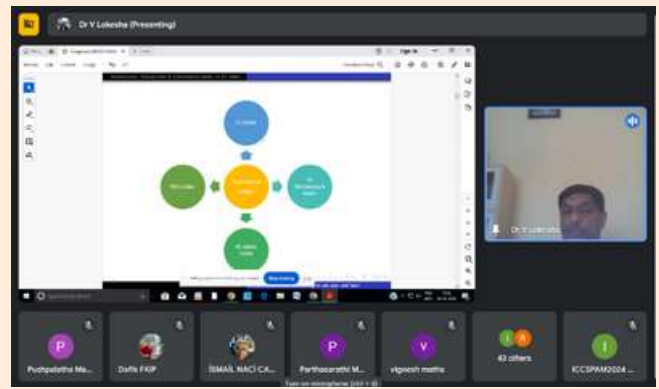
In the Technical Session V **Dr. Sivaraman Eswaran,** Computing (Cyber Security), Department of Electrical and Computer Engineering, Curtin University, Malaysia delivered lecture on the topic **"A Mathematical Lens on Privacy-Preserving AI Techniques in Healthcare using Federated Learning, Differential Privacy, and Homomorphic Encryption"**.In his lecture, he elaborated about the Privacy-preserving Artificial Intelligence Techniques, Differential privacy, Computations on Encrypted Data. He also provided an overview on Homomorphic Encryption and discussed the various types of Homomorphic Encryption schemes.
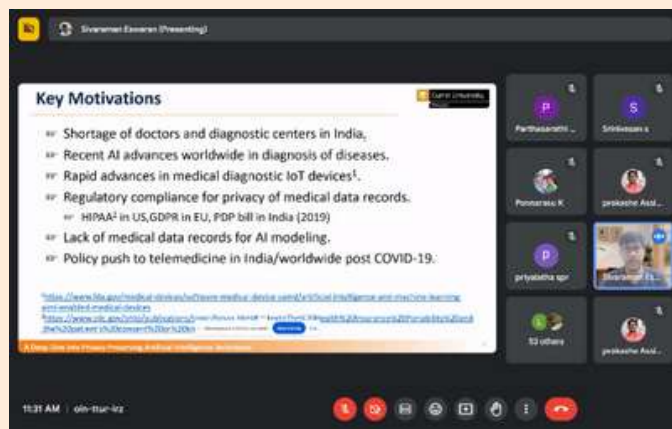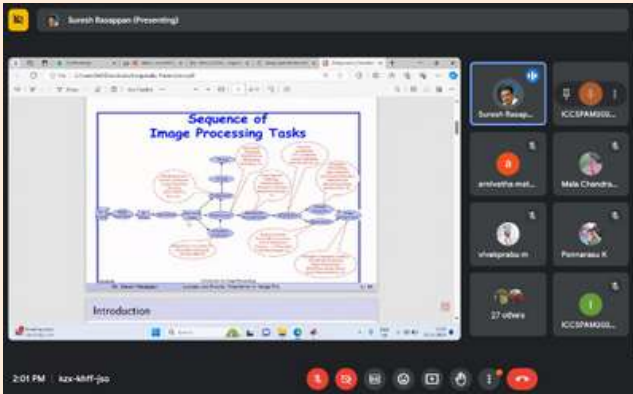

In the Technical Session VI Prof. **Dr. M. H. Rahmani Doust**, Department of Mathematics University of Neyshabur Neyshabur, Iran delivered a lecture on the topic **'A Nonlinear Mathematical Modelling and Application to Criminal Activity'.**

EVENT CORNER

Dr. Suresh Rasappan, Department of Mathematics, University of Technology and Applied Sciences – Ibri, Sultanate of Oman spoke on the topic **'Laplace and Fourier Transforms in Image processing'** in the Technical Session VII.

In the Technical Session VIII Prof. **Dr. B. Chaluvaraju,** Department of Mathematics, Bangalore University, Jnana Bharathi Campus, Bangalore delivered a lecture on the topic **'Significance of Discrete object (structures) studies through Graphs and Combinatorics'.**

In the Valedictory Session, **Dr. M.Venkatachalam**, Assistant Professor of Mathematics and Organizing Secretary of ICCSPAM2024 welcomed the gathering. Dr. M. Lekeshmanaswamy, Principal of the College delivered the Presidential address. **Dr. M. Vigneshwaran**, Assistant Professor of Mathematics and Organizing Secretary of the Conference presented the Report of the Conference. Prof. Dr. B. Chaluvaraju, Department of Mathematics, Bangalore University, Jnana Bharathi Campus, Bangalore offered the Valedictory Address. Finally, **Dr. S.P.R. Priyalatha** Assistant Professor of Mathematics and Organizing Secretary of the Conference proposed the vote of thanks.

Around **100 participants** attended this two-day conference and got benefitted.

EVENT CORNER

On the 2nd day of the Conference, More than 60 participants presented their papers in various disciplines of Mathematics. Eminent Researchers from various institutions acted as Session Chair. Best Paper in each session was awarded.

LIST OF BEST PAPER AWARD

A. G. Rose Venish, L. Vidyarani and M. Vigneshwaran presented a paper entitled **"Bridging Topologies: An Analogy Between Specific Topologies and Binary Topology Utilization"**

Denzil Jason Saldanha presented a paper entitled **"Unique Metro Domination of Circulant Graphs"**

V. Lokesha, A. S. Maragadam, Sushmitha Jain and Nirupadi .K presented a paper entitled **"Some Computational facet of amylose and blue starch-iodine complex"**

K. Abirami, N. Mohanapriya, M. Venkatachalam presented a paper entitled **"Enhancing Pasture Land Utilization in Multi-Species Roational Grazing through b - Color Antimagic Coloring in some special Graphs"**

N. Mohanapriya, V. Manipriya, R. Srimathi presented a paper entitled **"Analyzing the Impact of Dollarization and De-Dollarization on Foreign Export usingMachine Learning "**

P. Arulpandy presented a paper entitled **"Gray - Scale Image Segmentation with Speckle noise via Bipolar neutrosophic set"**

D. Vijayalakshmi, S. Mythili, S. Sakthi presented a paper entitled **"On Grundy Coloring of Join graph of Path graph with Star Graph Families and Complete graph"**

S. P. R. Priyalatha and R. Sowndariya presented a paper entitled **"On Binary Multiset Generalized Continuity and Binary Multiset Generalized Semi Continuity Topological space"**

THE FIRST

# Pure Mathematician

PYTHAGORAS OF SAMOS

M A T H E M A T I C I A N

Pythagoras was a **Greek philosopher** who was born in the 6th Century BC on the Greek island of Samos. He made important developments in **Mathematics, Astronomy, and the Theory of Music.**

Contributions

He discovered that in **music**, by beating strings tones are produced which are in a certain ratio and can be represented in whole numbers.
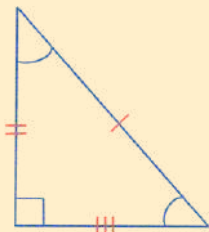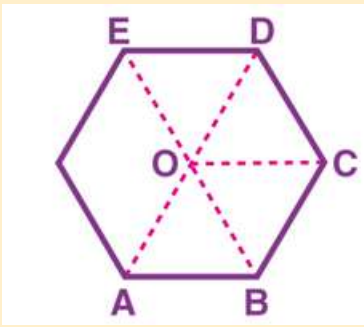
The **Angle Sum Property Of Triangle** was discovered by Pythagoras only when he proved that the sum of all angles of a triangle is equal to 180°.

He even contributed to the **discovery of Tetractys** which was a mathematical magic pyramid

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He also contributed to the **Polygon Angles** where he stated that the sum of interior angles of a polygon with n sides is 2n – 4 right angles and the sum of exterior angles will be equal to 4 right angles, which means 4 right angles subtracted from 2n then adding exterior angles will be equivalent to four right angles or simply 360°.
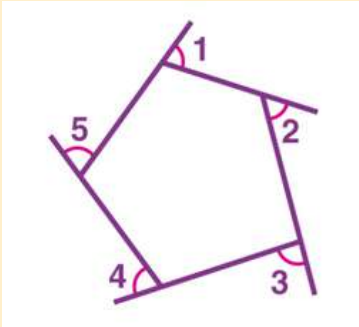
The most famous contribution for which Pythagoras is popular worldwide is the discovery of the **Pythagoras Theorem** which applies to all Right Angled Triangles.
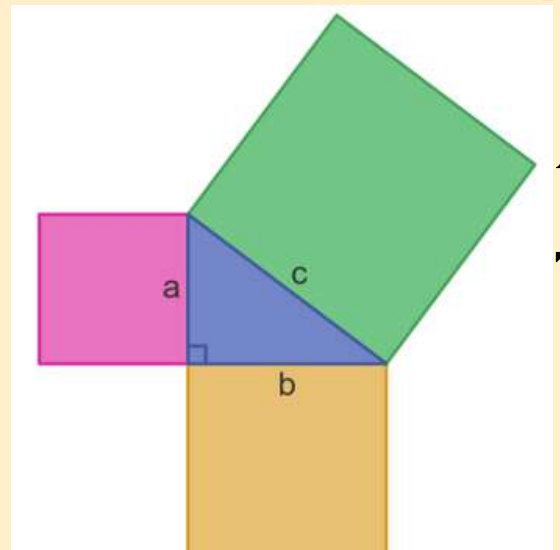
In the theorem, he stated that the sum of the squares of both Base and Height will be equal to the square of the Hypotenuse of a Right Angle Triangle.

This theory was a massive achievement in his career which even unlocked many treasures of mathematics out of which Trigonometry is the most prominent one.

What is
GEOMETRY

Geometry is the branch of mathematics that deals with shapes, angles, dimensions and sizes of a variety of things we see in day-to-day life. Geometry is derived from **Ancient Greek words** – **'Geo'** means 'Earth' and **'metron'** means 'Measurement'.

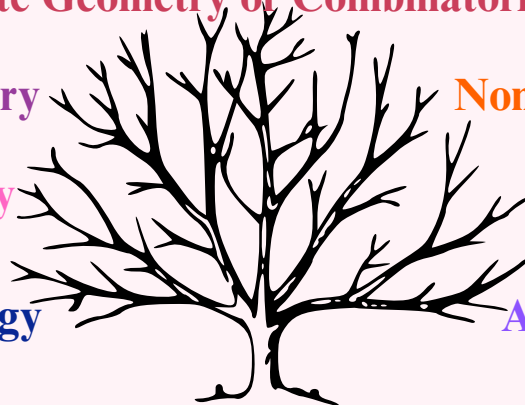**Discrete Geometry or Combinatorial Geometry**

Euclidean Geometry   **Non Euclidean Geometry**

Differential Geometry   **Projective Geometry**

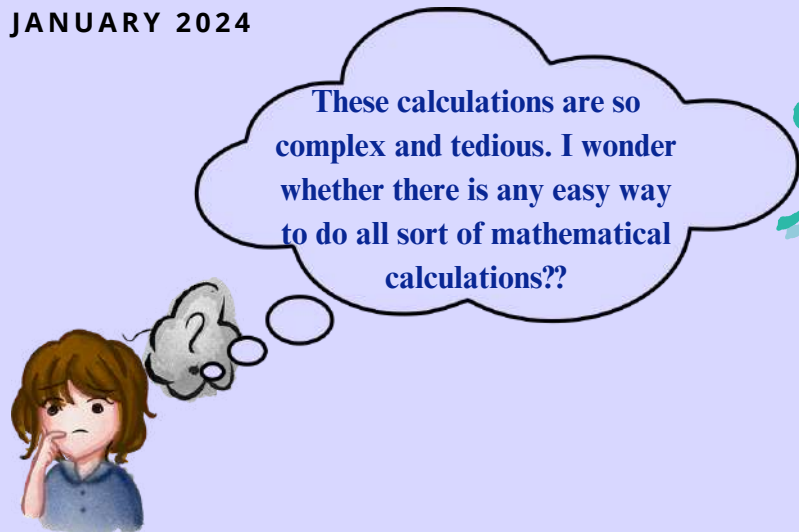**Topology**   **Algebraic Geometry**

Branches

Where do we use GEOMETRY?

Geometry has wide usage in daily life. Its major applications are in the **field of constructions**, such as the construction of building, roads, dams, bridges, etc. and also in surveying, mapping, navigation. In **software industries**, it is used in graphics designing, gaming, animations, etc. In the **medical field** as well, for CT scanning and MRI's geometry concepts are used.

GEOMETRY

These calculations are so complex and tedious. I wonder whether there is any easy way to do all sort of mathematical calculations??

Mathematical Software's

P R O G R A M M & M A T H

Besides, Calculation, these mathematical Software's are used for various other requirements such as Simulation, Data analysis and Visualization.
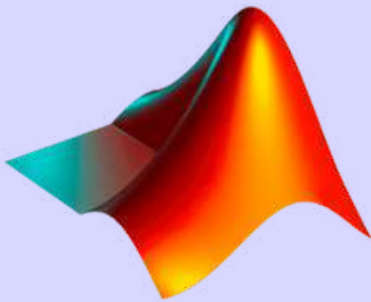
MATLAB: MATLAB provides a variety of mathematical functions, algorithms, and toolboxes for tasks such as linear algebra, statistics, optimization, signal processing, and also has extensive plotting and visualization capabilities.

Mathematica: Developed by Wolfram Research, Mathematica is a comprehensive computational software system used for symbolic and numeric computation, visualization, and programming. It covers a wide range of mathematical areas including calculus, algebra, differential equations, and more.

R: R is a programming language and environment specifically designed for statistical computing and graphics. It provides a wide variety of statistical and graphical techniques and is widely used in academia and industry for data analysis and statistical modeling.

Octave: Octave is an open-source alternative to MATLAB. It provides similar functionality for numerical computations and visualization, making it a popular choice for those who require MATLAB-like capabilities but prefer open-source software.
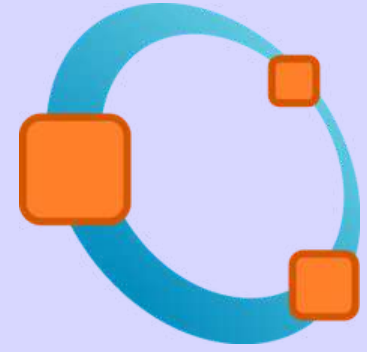
SageMath: SageMath is an open-source mathematics software system that integrates many open-source mathematical software packages under a common interface. It provides an extensive collection of mathematical libraries and tools for algebra, calculus, number theory, symbolic computation, and more.

Maple: Maple is a commercial mathematical software package that offers a wide range of features for symbolic and numeric computation, visualization, and programming. It is widely used in academia and industry for tasks such as mathematical modeling, simulation, and engineering analysis.

Python: Python, with libraries like NumPy, SciPy, SymPy, and Matplotlib, has become immensely popular for scientific computing and mathematical tasks. NumPy provides support for large, multi-dimensional arrays and matrices, along with a collection of mathematical functions to operate on these arrays. SciPy builds on NumPy and provides additional modules for optimization, integration, interpolation, and more. SymPy is a symbolic mathematics library, and Matplotlib is used for plotting and visualization.

PROGRAM&MATH

Math Facts

UNKNOWN

The word **"Hundred"** comes from the old Norse term, **"Hundrath"**, which actually means 120 and not 100

Most mathematical symbols weren't invented until the **16**th century. Before that, equations were written in words.

16th CENTURY

1000
one thousand

1,000 is the only number with an **"A"** in it From One to One Thousand

"Forty" is the only number that is spelt with letters arranged in alphabetical order

40

FACTS

ONE

"One" is the only number that is spelt with letters arranged in descending alphabetic order.

"Eleven plus two" is an **anagram** of "Twelve plus one" which is pretty fitting as the answer to both equations is 13. There are **13 letters** in both "Eleven plus two" and "Twelve plus one".

13

MATH
IN REAL WORLD

Mathematics can enhance **analytical thinking**, a skill that's **vital in AI**. People often think AI is magic, but it isn't. It's mathematics that creates the magic behind these inventions. To lead in today's AI-driven world, you need to master mathematical concepts like **linear algebra, calculus and probability.**
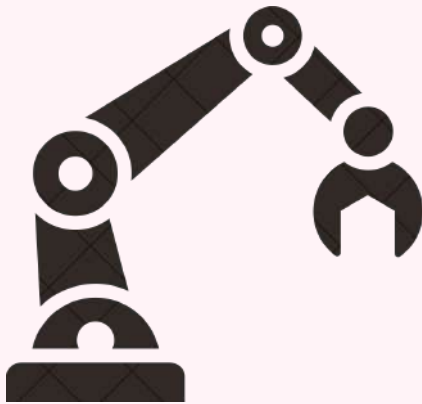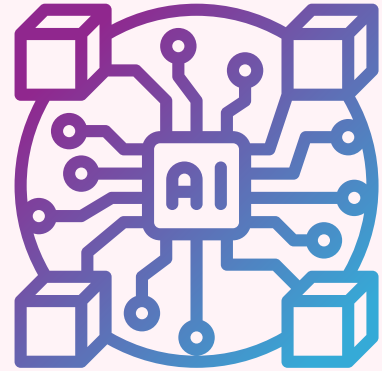
Robot kinematics applies geometry to the study of the movement of multi-degree of freedom kinematic chains that form the structure of robotic systems. The emphasis on **geometry** means that the links of the robot are modeled as rigid bodies and its joints are assumed to provide pure rotation or translation.

The importance of mathematics in technology cannot be overstated. Mathematics provides the language and tools to describe and analyze the physical world, which is essential for technological innovation and progress.

In **Technology**, mathematics is used to model, simulate, and optimize systems and processes. Computer scientists use mathematics **to develop algorithms** and optimize software. Mathematics also underpins many fundamental technologies, such as telecommunications, cryptography, and data science.

APPLICATIONS

In **Engineering**, mathematics is used in designing structures and buildings using **principles of geometry and trigonometry**, developing algorithms for computer simulations and modeling in fields like aerospace, automotive, and mechanical engineering and Solving problems related to electricity, circuits, and signal processing using calculus and differential equations.
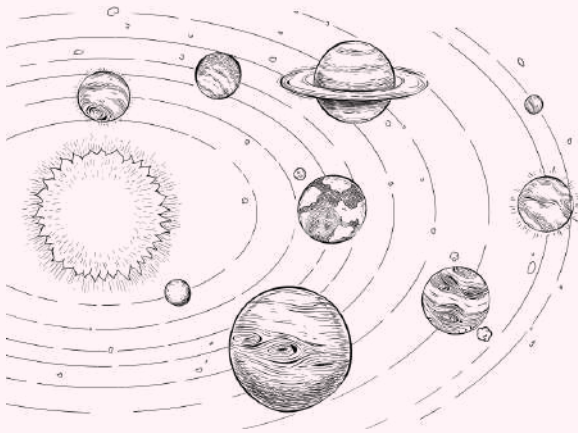
In **Science,** Mathematics is used in describing natural phenomena and predicting behaviors using **mathematical models** in physics, chemistry, biology, and environmental science, analyzing experimental data and drawing conclusions using statistical methods and Calculating trajectories and **orbits in astronomy** and **astrophysics**.

In the **field of Medicine**, Mathematics is used in Modeling to know about the spread of diseases and predicting outbreaks using epidemiological models, **analyzing medical images** (e.g., MRI, CT scans) **using image processing techniques**. and calculating drug dosages and administering treatments based on patient characteristics and medical history.

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Brain Teaser

SUPER OVER

1 Name the circle which touches all sides of the polygon.

2 At what time between 7 and 8 O'clock, the two hands of the clock will be in the straight line?

3 What is the geometrical shape associated with the open pantograph?

4 What are the three integers in the arithmetic sequence whose product is a prime?

5 What do you call the two circles that cut right across each other?

6 Is the number 222221 a prime?

Math Puzzle

PUZZLES

A) Find the missing number?

2	3	4
6	7	8
10	11	12
58	74	?

B) Use the numbers between 1 and 9 exactly once to satisfy the given equations.

$$\square + \square = \square$$
$$\div$$
$$\square - \square = \square$$
$$=$$
$$\square = \square \times \square$$

A Special MAGIC Square!

96	11	89	68
88	69	91	16
61	86	18	99
19	98	66	81

Turn the Magic Square around and see. YESS! This is a Magic square both upside down and right side up.

Lattice Multiplication

The product of 948 and 827 is 783996. Here we use the Lattice Method. In this Multiplication each cell is the product of the number at the top of the each column and to the right of each row and the sums are added along the diagonals from the bottom to obtain the product.

Think and Answer

It was Sunday on Jan 1, 2006. What was the day on Jan 1, 2010?

On 31st December, 2005 it was Saturday. Between 2006 and 2009, there is one leap year. The number of days in each year mod 7 sums to 5. (i.e., 1 + 1 + 2 + 1 = 5). Hence 31st December 2009 falls on Thursday. Thus, 1st Jan, 2010 is a Friday.

DID YOU KNOW

The Number & The Square!

1	9	2
3	8	4
5	7	6

In the diagram given above, the numbers from 1 to 9 are arranged in a square in such a way that the number in the second row is twice that in the first row and the number in the bottom row is three times that in the top row. There are three other ways of arranging the numbers so as to produce the same result. Can you find the other three ways?

The Key is Logic!

1 Out of 15 Match sticks, 5 squares are made as shown in the figure, If one has to shift the position of 3 Match stick s and make it 4 squares, what should be the possible moves
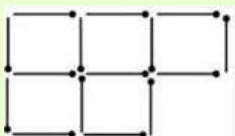
2 If MADRAS is coded as 19-7-10-24-7-25, then what is the code for SPIDER?

3 If GOOGLE is coded as 4 and ABSENTEE as 6, then what is the code for LETTERS?

4 If A = 26^1, B = 25^2, C = 24^3, D = 23^4 .... Y = 2^25 and Z = 1^26 then evaluate (Y - A) * (Y - B) * (Y - C) * ... * (Y - Z).

5 Find the odd one out: 8, 27, 64, 100, 125, 216, 343

DIDYOUKNOW

Sudoku is a logic-based combinatorial number-placement puzzle. But,

WHAT IS SAMURAI SUDOKU

Samurai Sudoku puzzles consist of five overlapping Sudoku grids. The standard Sudoku rules apply to each 9 x 9 grid. Place digits from 1 to 9 in each empty cell. Every row, every column, and every 3x3 square should contain all the integers between 1 and 9 exactly once. Before moving ahead with the Samurai Sudoku, first try to solve the usual Sudoku given here. Pat yourself if you can make it within 5 minutes.

SUDOKU

UNVEILING THE MYSTERIOUS WORLD

Ever wondered what makes the world go around and around? Well, besides gravity and good people like us, it's those magical little guys, we call them **"Mathematical formula"** ! These friends are the secret sauce behind everything from rocket launches to your morning pancake recipe. When anyone say the word "Mathematics", the first word that comes to our mind is nothing but "Formula". Even now, Most of the people around us look at the Mathematicians like as if they have come from another planet!

Let's explore the History

Egyptians discovered the formula for the **Area of rectangle. Babylonian** developed the methods for approximating square roots.

Sulba Sutras, ancient Indian texts, contain geometric constructions and formulae related to the construction of altars for Vedic rituals. They include **procedures for constructing various geometric shapes** such as squares, rectangles, circles, and triangles.

One of the earliest formulated mathematical theorems is the **Pythagorean theorem,** credited to the ancient **Greek mathematician Pythagoras** (600 BCE).

MYSTERY

Formulae
INEVITABLE

300 BCE

17th Century

19th Century

20th Century
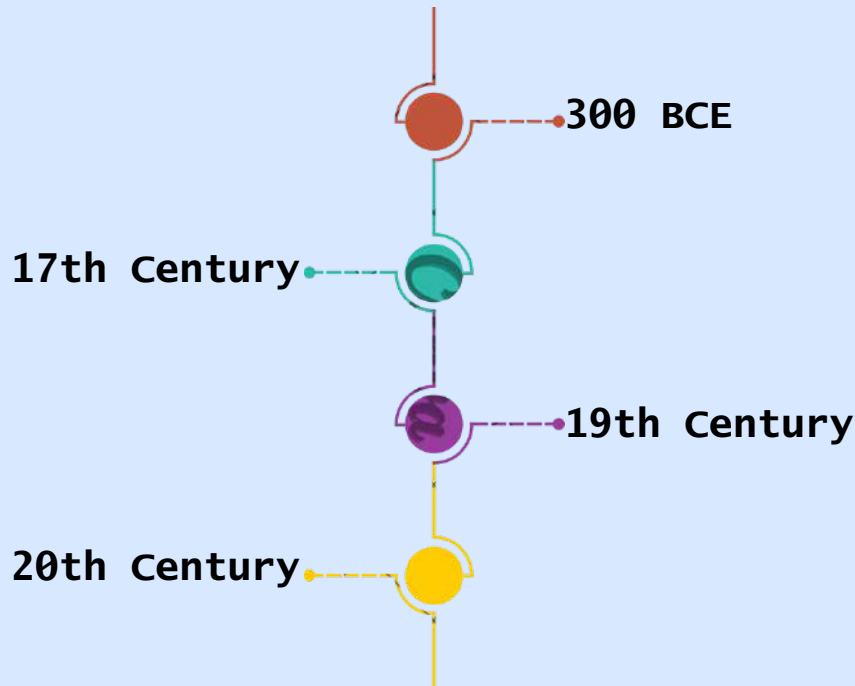
MYSTERY

Euclid's book **"Elements"** introduces foundational principles of geometry, including formulas for geometric shapes and theorems.

Newton develops calculus, providing formulas for derivatives and integrals, revolutionizing mathematics and physics.

Leibniz also develops calculus, contributing to the formulation of derivative and integral formulas.

Gauss makes significant contributions to number theory, geometry, and physics, including formulas for quadratic reciprocity and electromagnetism.

Ramanujan's groundbreaking work in number theory and mathematical analysis yields numerous formulas, including those related to partitions, modular forms, and infinite series

SAMURAI SUDOKU - PAGE TWENTY THREE

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SUPER OVER - PAGE TWENTY

1. Circumscribed circle
2. 5 minutes past 7
3. Parallelogram
4. –3, –1,1
5. They intersect orthogonally
6. No. 222221 = 619 x 359.

MATH PUZZLE - PAGE TWENTY

A) In the first column, (10x6) – 2   = 58
In the second column,(11x7) – 3   = 74
So, missing number =(12x8) – 4 = 92.
Hence, the answer is 92.

B) 1 + 7 = 8, 9 – 5 = 4, 6 = 3 x 2

THE NUMBER & THE SQUARE - PAGE TWENTY TWO

The top row should be one of the four following numbers : 192, 219, 273 or 327. While the first was the example given, the following are the remaining three ways.
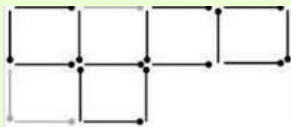
2	1	9
4	3	8
6	5	7

2	7	3
5	4	6
8	1	9

3	2	7
4	3	8
6	5	7

THE KEY IS LOGIC - PAGE TWENTY TWO

1.4 squares can be made if 3 matches can be moved in the following ways.

2. Each letter is added + 6 steps to its alphabetical position (similar to Julius Caesar cipher). So the answer is: 25-22-15-10-11-24.

3 Each word is coded by the number of unique alphabets present in the word. Number of unique alphabets in "LETTERS" are 5

4. $(Y – A) * (Y – B) * (Y – C) * ... * (Y – Y) * (Y – Z)$ equals 0 since $(Y – Y)$ is zero.

5. 100 is the odd one among the given numbers because all others are cube numbers.

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"MATHEMATICS REVEALS ITS SECRETS ONLY TO THOSE WHO APPROACH IT WITH PURE LOVE, FOR ITS OWN BEAUTY" - ARCHIMEDES
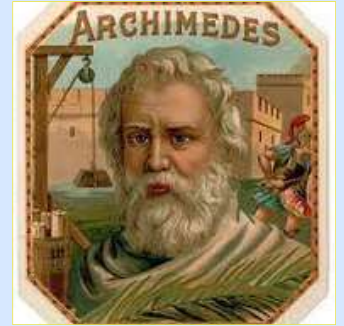
"MATHEMATICS IS THE QUEEN OF SCIENCES AND NUMBER THEORY IS THE QUEEN OF MATHEMATICS" - CARL FRIEDRICH GAUSS