স্তূপীয়া

প্রথম সংখ্যা, ২০২৪ বর্ষ

গণিত বিভাগ

আর্য্য বিদ্যাপীঠ মহাবিদ্যালয় (স্বায়ত্তশাসিত)

STUPIYA

E-magazine First Edition , Year 2024

Department of Mathematics

Arya Vidyapeeth College (Autonomous)

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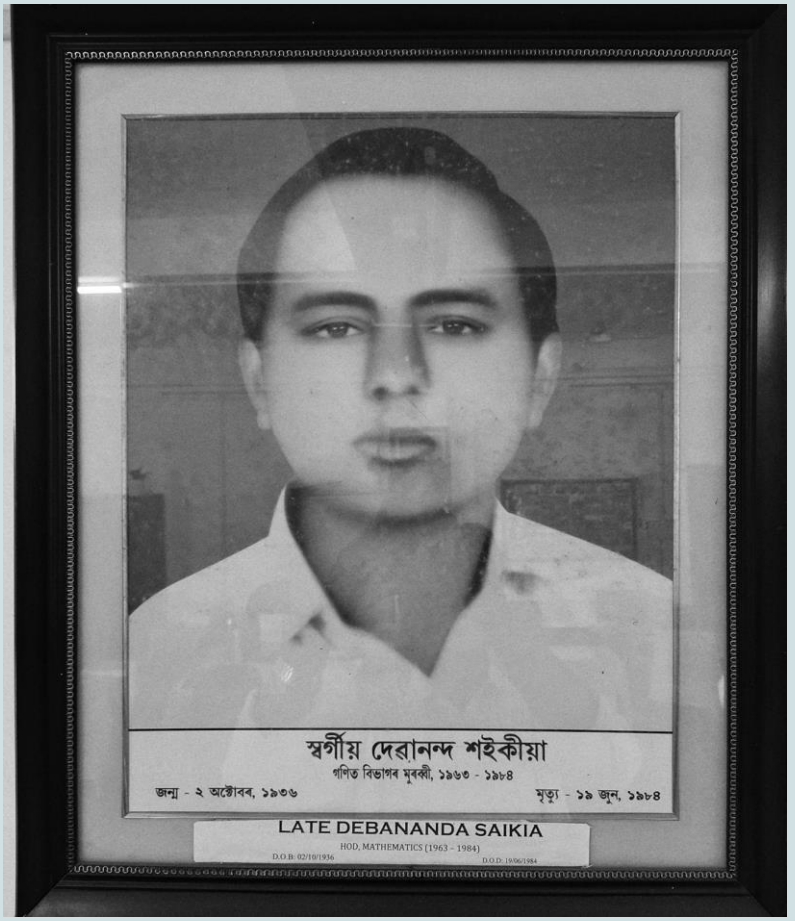

উচৰ্গা

জাকতজিলিকা আৰ্য্যবিদ্যাপীঠ মহাবিদ্যালয় (স্বায়ত্তশাসিত)-ৰ গণিত বিভাগৰ সোণোৱালী ইতিহাস খুচৰিলে এটি নাম আজিও উজ্জ্বল নক্ষত্ৰৰ দৰেই জিলিকি থকা দেখা পাওঁ। এইগৰাকী মহান মনীষীৰ কষ্ট আৰু ত্যাগে বহুতক জীৱনৰ বাট দেখুৱালে। তেখেতৰ জ্ঞানৰ জ্যোতিয়ে বহুতৰে জীৱন পোহৰাই তুলিলে। সেইগৰাকী মহান শিক্ষাগুৰু শ্ৰদ্ধাৰ দেৱানন্দ শইকীয়া দেৱৰ শ্ৰীচৰণত আমাৰ এই প্ৰথম বিভাগীয় বাৰ্ষিক ই-আলোচনীখন উচৰ্গা কৰিলোঁ।

Unveiling
The Art of Precision : Where Math Inspires
Creativity

- EDITORIAL BOARD -
Sushmita Devi and Sourav Kalita

Dear Readers,

We are excited to introduce the very first edition of the Departmental E-Magazine from the Department of Mathematics at Arya Vidyapeeth College (Autonomous). This publication brings together creative and insightful contributions from both professors and students, featuring articles, illustrations, and artistic pieces in both English and Assamese. Our hope is that through these works, readers will explore and appreciate intriguing concepts drawn from the vast world of mathematics.

This issue is a treasure trove of diverse articles that delve into mathematical mysteries and reveal its inherent beauty through captivating visuals. Each piece not only showcases the contributors' creative talents but also reflects their curiosity and dedication to understanding the wonders of mathematics.

We are truly delighted to honor and congratulate all the writers and contributors, and we extend our heartfelt gratitude to our Principal, Dr. Pradip Kr. Bhattacharyya, and the Head of the Mathematics Department, Dr. Biren Das, for granting us the opportunity to create this magazine. We are also deeply thankful to our departmental professors for their unwavering support and encouragement, as well as to our classmates, juniors, and seniors for their cooperation throughout this endeavor.

We hope this E-Magazine will be warmly received by all and that readers dive into this ocean of mathematics, discovering and enjoying its true essence.

Happy Reading!

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সম্পাদকীয় একাষাৰ

গণিত। অধিকাংশ লোকৰ বাবে ই অতি ভয়ানক।এখন মহাসাগৰ, য'ত সাতুৰি ইপাৰ-সিপাৰ হোৱাটো অসম্ভৱ। ভয়-সংশয়ৰ মাজেৰে যেতিয়া মইয়ো সাগৰ খনত ডুব মাৰিলো, তেতিয়া মই দুটা কথা স্পষ্টকৈ বুজিলো ---

সাগৰখন দ। পাৰ হ'ব মইয়ো নোৱাৰিম।
ভয়ানক! ওহো, মুঠেই নহয়।

উন্নতিৰ জখলাডাল হেনো শূণ্যৰ পৰা আৰম্ভ হয়। তেনেহলে শূণ্যৰে আৱিস্কাৰ কৰা আমাৰ দেশখনত উন্নতিৰ জখলাডাল দেখোন গণিতজ্ঞ সকলে নিজ হাতেৰে সাজি গৈছে। যেতিয়াৰে পৰা মায়ে ৰন্ধা আঞ্জাখনত , দেউতাৰ চাইকেলেৰে কম সময়ত অতিক্রম কৰা দূৰত্বৰ মাজত থকা সংখ্যাৰ খেল বুজি পালো, গণিত শিকাৰ আগ্রহ বাঢ়ি গৈ থাকিল। তাৰোপৰি বজাৰ-সমাৰ কৰোঁতে হোৱা ৰেহাইৰ গণনাৰ পৰা শৰীৰত পুষ্টিৰ পৰা তেজৰ পৰিমাণলৈকে সকলোৰে প্রকাশিত পৰিচয় যে মাথো গণিত।

কেতিয়াবা আচৰিত হওঁ, বাহুবলী, RRR ৰ দৰে চিনেমাচাই মন্ত্রমুগ্ধ হোৱা আমাৰ দর্শকৰ মনলৈ চিনেমাবোৰত দেখাপোৱা সেই স্পেচিয়েল ইফেক্ট বোৰ যে গণিতৰ এলগৰিদমৰ সহায়তে প্রস্তুত হয়, সেইয়া জানিবলৈ মন যায় নে? থ্রী-ডি মডেল, এনিমেচন এই সকলোবোৰো যে গণিতৰে কাৰুকার্য।

প্রযুক্তিবিদ্যাৰ উন্নতিৰ জয়গান সকলোৱে গায়। কিমান সহজতে হাতত থকা মোবাইল ফোনটোৰ পৰা সাতসাগৰ- তেৰনদী পাৰলৈ টকা পঠিয়াব পাৰি বুলি হাত-চাপৰি বজায় ! সেইসময়ত কেতিয়াবা নিজৰ মাজতে প্রশ্ন উঠে নে বেংকৰ সকলো তথ্য উদঙাই দিয়াৰ পাছতো, মোৰ টকাবোৰ সম্পূর্ণৰূপে কেনেকৈ সুৰক্ষিত? মন খুলি হুৰাটছএপত অচিনাকি মানুহৰ সৈতে কথা পতা , ব্যক্তিগত তথ্য বা নথি-পত্র আদান-প্রদান কৰোঁতে নিঃসংকোচে কেনেকৈ হাঁহি থাকে? কাৰণ আপোনাৰ অজ্ঞাতেই কোনো তৃতীয় ব্যক্তিয়ে আপোনাৰ তথ্য ল'ব নোৱাৰাকৈ গণিতে সুৰক্ষা প্রদান কৰি আছে। ইয়াৰ উপৰিও আকাশত দেখা উৰাজাহাজখন, টিভিৰ সন্মুখত বহি চাই গৌৰৱ অনুভৱ কৰিব পৰা সেই চন্দ্রায়ন -৩ খন সকলোতে গণিত বিৰাজমান।

আমাৰ দুচকুয়ে সামৰিব পৰা পৰিসৰৰ বাহিৰতো যে গণিত বিস্তাৰিত , সেইবিষয়ে সকলোকে জ্ঞাত কৰাবলৈ মই আমাৰ বিভাগীয় শ্রদ্ধাৰ শিক্ষাগুৰুসকলৰ উপদেশত এই গাণিতিক ই-আলোচনী খনৰ কাম হাতত লৈছিলো।সেয়ে পোনপ্রথমে বিভাগৰ সকলো ছাৰ-বাইদেউ লৈ মই ধন্যবাদ জ্ঞাপন কৰিছোঁ । এই কালছোৱাত মোক প্রতিমুহূর্তেতে সহযোগ কৰা মোৰ সহসম্পাদক ***সৌৰভ কলিতাক*** মই অশেষ ধন্যবাদ জনাইছোঁ। আলোচনীখনৰ বাবে প্রয়োজনীয় সকলো ছবি আৰু ডিজাইন হাতেৰে আঁকি প্রদান কৰাৰ বাবে বিদিশা ৰাভালৈও অশেষ ধন্যবাদ । ইয়াৰ উপৰিও আলোচনীখনৰ বাবে নিজৰ লেখা প্রদান কৰি আমাক সহযোগ কৰাৰ বাবে বিভাগৰ সকলো বন্ধু-বর্গ আৰু ভাই-ভনীক মোৰ কৃতজ্ঞতা জ্ঞাপন কৰিছোঁ।

সুস্মিতা দেৰী
স্নাতকোত্তৰ ৩য় ষান্মাসিক

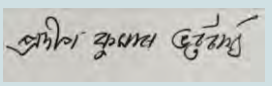
অধ্যক্ষৰ একলম :

ঐতিহ্যমণ্ডিত আর্য্যবিদ্যাপীঠ মহাবিদ্যালয়ৰ ইতিহাসৰ পাতত জিলিকি থকা এটি উজ্জ্বল নাম হৈছে " স্বর্গীয় দেৱানন্দ শইকীয়া "দেৱ। মহাবিদ্যালয়ৰ গণিত বিভাগটোক সমগ্র অসমৰ শিক্ষানুষ্ঠান সমূহৰ মাজত এটি উচ্চ স্থান দিয়াত তেখেতৰ যি অৱদান, সেইয়া অতুলনীয়। তেখেতৰে স্মৰণত গণিত বিভাগৰ শিক্ষক-শিক্ষয়িত্রী আৰু ছাত্র-ছাত্রীসকলে মিলি এখনি ডিজিটেল আলোচনী প্রকাশ কৰিবৰ বাবে কৰা প্রচেষ্টাক মই শলাগ লৈছোঁ।

তাৰোপৰি, বর্তমান সময়ত ই-আলোচনীখনৰ মহত্ব ছপা আলোচনী এখনতকৈ কোনোগুনেই কম নহয় । ই-আলোচনী এখন প্রকাশৰ পাছতেই সমগ্র বিশ্বৰ আগ্রহী পাঠকৰ বাবে সহজে উপলব্ধ হৈ পৰে । কোনো ছপা বা পৰিবহন খৰচ নোহোৱাৰ ফলত প্রকাশক আৰু পাঠকৰ বাবে ই অধিক সুলভ ।

সেয়ে মহাবিদ্যালয়ৰ গণিত বিভাগৰ প্রথমখন ই-আলোচনী "স্তূপীয়া" প্রকাশৰ বাবে মোৰ আশীর্বাদ আৰু অভিনন্দন জ্ঞাপন কৰিছো! এই কৃতিত্ব ছাত্র-ছাত্রীৰ উৎকৃষ্টতাৰ যাত্রাৰ এক মাইলৰ খুঁটি হওক আৰু ই ভৱিষ্যত প্রজন্মৰ গণিত অনুৰাগীসকলক অনুপ্রাণিত কৰক।

শুভেচ্ছাৰে



ড° প্রদীপ কুমাৰ ভট্টাচার্য্য
অধ্যক্ষ,আর্য্য বিদ্যাপীঠ মহাবিদ্যালয় (স্বায়ত্তশাসিত)

It is a matter to sheer delight that the Department of Mathematics, Arya Vidyapeeth College (Autonomous), is going to publish its first volume of annual E-magazine “Stupiya”. I congratulate the faculty members and students of the department for their efforts and wish that this magazine will be informative and resourceful.

I convey my best wishes to all the noble endeavors of the Department of Mathematics and hope the “Stupiya” will be immensely beneficial to all concerned.

With regards

Ms. Anita Talukdar
Vice Principal
Arya Vidyapeeth College (Autonomous)

From HOD's Desk -

I believe the e-magazine is an excellent platform for college students to express their ideas and showcase their creativity. It offers a unique opportunity for students to share their thoughts, explore new perspectives, and develop a stronger voice. To all students, I encourage you to stay true to your decisions and maintain a positive outlook. Life will present challenging situations, but remember—don't let nerves or distractions hold you back. With determination and focus, you can overcome any obstacle.

For those actively contributing to the e-magazine, I want to say, "keep up the great work. Your dedication and hard work will surely lead you to success. Through this initiative, the e-magazine cell plays a vital role in fostering essential qualities like self-motivation, confidence, and a thirst for success. Beyond self-expression, this platform provides valuable insights into entrepreneurship, helping students develop crucial skills and uncover their hidden potential. It's not only about enhancing writing or editing abilities; it's about preparing for the future with confidence and resilience."

With regards

Biren Das

Dr. Biren Das

HOD, Department of Mathematics

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কবিতাৰ শিতান -

Recent Departmental Accomplishment

History of Mathematics

The word “mathematics” is derived from the Ancient Greek word “máthēma (μάθημα)”, which means “that which is learnt” ,“what one gets to know”, hence also “study” and “science”. In the ancient world, mathematics was regarded with a mix of practical utility, philosophical curiosity, and sometimes even mystical reverence. Across the ancient civilizations, mathematics was valued both for its practical applications and in some cultures for its deeper philosophical significance. It was often seen as a means to understand and manipulate the world, whether through building monumental structures, predicting celestial events, track time , or exploring the nature of reality itself .

Concepts and Relationships: Contemporary mathematicians focus on abstract concepts that are validated through proof. Historically, mathematics was seen as the science of numbers, magnitudes, and forms. Early examples of mathematical activity, like counting and geometric patterns, are often found in archaeological remnants, though their historical significance can be limited. To gain historical importance, these actions must be connected to others that indicate a shared knowledge or practice, opening the door to studies of transmission and conceptual change. In non-literate cultures, mathematical practices may be preserved in oral traditions or linked to rituals, making their significance harder to evaluate. The concept of number likely emerged from recognizing contrasts, such as one wolf versus many, which gradually led to the recognition of similarities and the birth of mathematics. Evidence suggests that early humans counted in simple ways, with some languages preserving distinctions between one, two, and many. Over time, counting methods evolved, using fingers, stones, or notched bones as records, some of which date back tens of thousands of years. These artifacts highlight the ancient origins of numerical concepts, far older than previously thought.

Early Number Bases: Historically, counting by fives and tens emerged later than counting by twos and threes, but quinary and decimal systems often replaced binary and ternary ones. Among American Indian tribes, around one-third used a decimal base, another third used quinary or quinary-decimal systems, and less than a third used binary. Only about 1% used a ternary system, while 10% adopted a vigesimal (base-20) system.

Early Mathematics in India: Archaeological excavations at Mohenjo Daro and Harappa reveal a highly advanced Indus Valley civilization around 2650 BCE, but no mathematical documents from that time have been found. Evidence of structured weights, measures, and a decimal-based numeration system exists. However, due to migrations, conquests, and undeciphered languages, it is difficult to map early mathematical activities in the region. Much of the knowledge from this era comes from oral traditions, including Vedic Sanskrit, which provides some of the earliest information on Indian mathematics. The Vedas, religious texts, reference large numbers and decimal systems. The Sulbasutras, a set of rules for measuring and constructing ritual altars using cords, reveal early geometric knowledge, similar to Egyptian practices. However, there is uncertainty about Egypt's influence on Indian mathematics and a lack of continuity in Indian mathematical tradition.

Aryabhata : In the sixth century, two Indian mathematicians wrote on similar topics, with Aryabhata being the most notable. His work, Aryabhatta (499 CE), is a concise text written in verse, covering astronomy and mathematics. While earlier Hindu mathematicians are known, their works have largely been lost. The Aryabhatiya holds a similar place in Indian mathematics as Euclid's Elements does in Greece, though they differ significantly. Elements is a systematic, abstract work of pure mathematics, while Aryabhatiya is a brief, descriptive text with no deductive reasoning, focused mainly on calculations for astronomy. About a third of the work is dedicated to mathematics, including powers of 10 and instructions for calculating square and cube roots. One statement in the Aryabhatiya to which Indian scholars have pointed with pride is as follows:

"Add 4 to 100, multiply by 8, and add 62,000. The result is approximately the circumference of a circle of which the diameter is 20,000. (Clark 1930, p. 28)"

Here we see the equivalent of 3.1416 for π, but it should be recalled that this is essentially the value Ptolemy had used. The likelihood that Aryabhata here was influenced by Greek predecessors is strengthened by his adoption of the myriad, 10,000, as the number of units in the radius.

The Symbol for Zero- The reference to nine symbols, rather than ten, suggests that early Hindu numeration lacked a zero symbol. Remarkably, the first known appearance of zero in India is from an inscription in 876 CE, over two centuries after references to the other nine numerals. It's unclear if zero developed alongside these numerals or separately. Some scholars suggest that zero may have originated in the Greek world, possibly in Alexandria, and was later introduced to India after the decimal system was established.

Who Invented the Number Zero ?

In India, zero was developed as part of the broader mathematical system. Aryabhata (5th century AD) and Brahmagupta (7th century AD) played crucial roles in its development. Aryabhata's place-value system and Brahmagupta's formalization of zero's arithmetic properties were key milestones in the history of zero. Brahmagupta, the 7th-century Indian mathematician, introduced the concept of zero to the world, the earliest known methods for incorporating zero into calculations, treating it as a number for the first time. His innovations in the use of zero were later inscribed on the walls of the Chaturbhuj Temple in Gwalior, India. In conclusion, the history of mathematics is deeply intertwined with the development of human civilization, offering both practical tools and philosophical insights. From its ancient origins in counting and geometric patterns to the sophisticated systems of numeration and algebra, mathematics has shaped the way people understand the world around them. Early mathematical practices, like those of the Indus Valley civilization, and the significant contributions from mathematicians such as Aryabhata and Brahmagupta, highlight its diverse global evolution. All the mathematical advancements, underscores the transformative power of these ideas, leaving a lasting impact on fields far beyond mathematics itself.

~Sourav Kalita
B.Sc. 5th semester

Medieval Mathematics : Battling the Odds

The medieval period, spanning for roughly 1000 years between 5th century AD and 15th century AD, was a phase of significant mathematical development but was filled with various challenges. Mathematicians all over the world had to face and vanquish distinct obstacles while making the growth of mathematics possible. Some major challenges faced by the mathematicians of that time are listed below:

Preservation of Knowledge: In medieval times, long before the invention of printing press, the knowledge was passed either orally or through handwritten manuscripts. Copying manuscripts was a time consuming and error-prone process. Oral transmission was also vulnerable to being distorted. By the fall of Roman Empire, most of the Greek knowledge, including that of mathematics was lost. In India also knowledge hubs like Nalanda and Vikramshila were destroyed by invading forces leading to loss of countless manuscripts and scholarly work.

Lack of Collaboration: Several political, cultural and geological reasons caused the mathematicians to work in isolation. There was not any dedicated network to share the ideas across regions. At the same time, some scholars were reluctant to share knowledge in fear of plagiarism.

Cultural and Religious Restrictions: The cultural and religious constraints were different for different regions. In Europe, the Church had significant control over intellectual researches and any discovery contradicting Christian beliefs was suppressed. Also, Latin being the only scholarly language restricted inter-cultural exchanges. On contrary Indian mathematics was deeply linked to religious and philosophical studies. The mathematical concepts mainly developed around Jyotisha(astronomy). However, the knowledge was accessible to only certain groups of people, often belonging to higher classes of society.

Technological Limitations: In the medieval time the available tools for mathematical calculations were not enough to make use of the contemporary ideas arising by that time. Abacuses and counting boards had limited capacity of complex calculations. That way, though arithmetic and algebraic algorithms were developed, the lack of compatible technology and machinery hindered in the practical applications of the algorithms.

Language Barrier: The lack of a common language to communicate was a major inconvenience in exchanging mathematical works. In India alone apart from Sanskrit, several regions had their own language and ways of writing numerical symbols. Arabs were among the first foreigners to access to classical Indian mathematics, though it took quite some time and it took even a longer period to reach western countries. Also, for Europe these texts had to be translated into Latin from Greek and Arabic, which often resulted in inaccuracies.

~Jyotishman Sharma

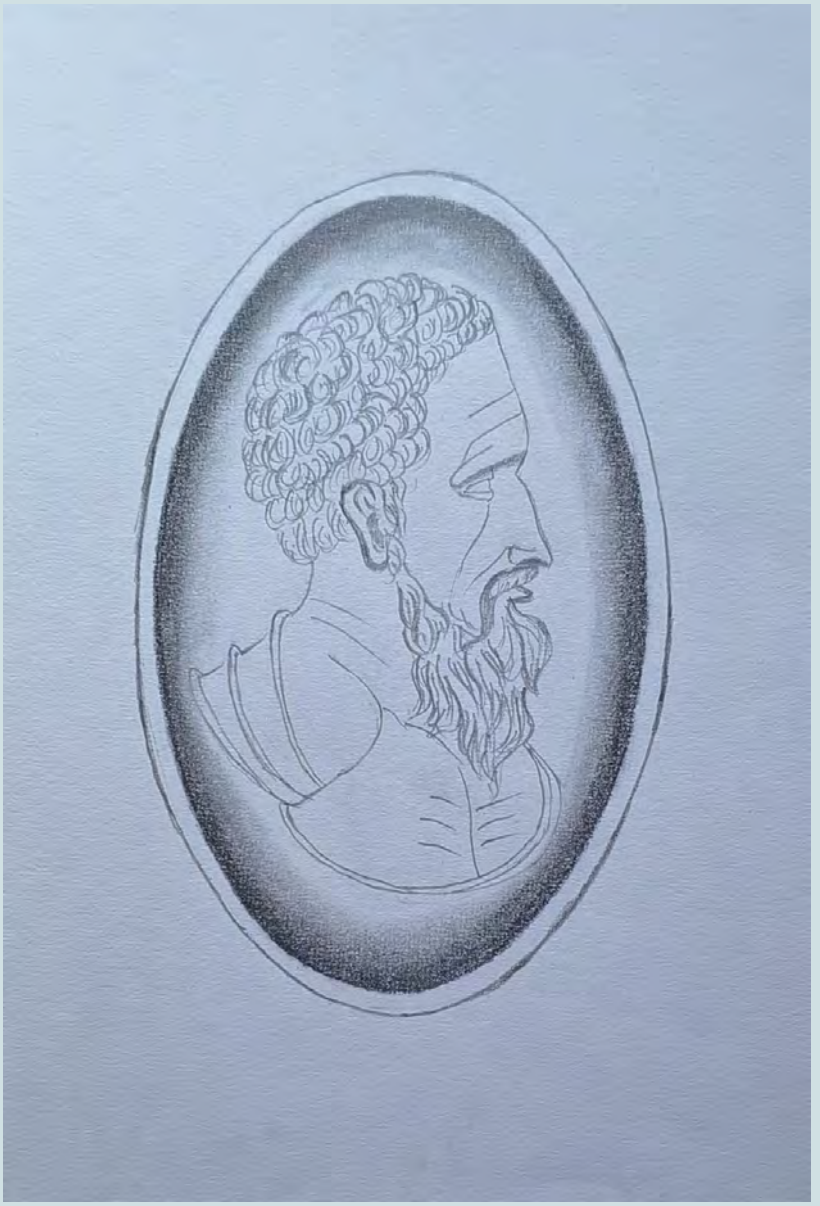
FYUGP 3rd semester

Famous Personalities : Hipparchus

Hipparchus, an ancient Greek mathematician, is known as the founder of Trigonometry. In about 140 BC, Hipparchus created the first known table of chords, which is thought to have been made up of twelve books.

Trigonometry was originally developed for use in astronomy and geography, but its use has since expanded to other fields, including physics.

Hipparchus also made significant contributions to understanding the length of the solar year, estimating it with impressive accuracy for his time. He is credited with the discovery of the precession of the equinoxes, observing that the positions of the stars shift gradually over centuries.



Drawn by: Bidisha Rabha, FYUGP 3rd semester

Using his keen observational skills, he compiled one of the earliest star catalogs, listing around 850 stars and categorizing them by their apparent brightness. Hipparchus's work laid the foundation for later astronomers, such as Ptolemy, who built upon his data and methods. His mathematical insights, particularly in trigonometry, set a standard for scientific rigor and helped shape the future of mathematics and astronomy.

~Priya Sutradhar

FYUGP 1st semester

Baudhayana: The Earliest Known Mathematician of India

Pythagorean theorem, the well-known geometric theorem that the sum of the squares on the legs of a right triangle is equal to the square on the hypotenuse (the side opposite the right angle)—or, in familiar algebraic notation, $a^2 + b^2 = c^2$. Although the theorem has long been associated with Greek mathematician-philosopher Pythagoras (c. 570–500/490 BCE), it is actually far older. Four Babylonian tablets from circa 1900–1600 BCE indicate some knowledge of the theorem, with a very accurate calculation of the square root of 2 (the length of the hypotenuse of a right triangle with the length of both legs equal to 1) and lists of special integers known as Pythagorean triples that satisfy it (e.g., 3, 4, and 5; 32 + 42 = 52, 9 + 16 = 25). The theorem is mentioned in the Baudhayana Sulba-sutra of India, which was written between 800 and 400 BCE.

The Sulbas,are sections of the Kalpa-sütras, more particularly of the Srauta-sutras, which form one of the six Vedāngas (or "The Members of the Veda") and deal specially with rituals or ceremonies . From the Sulba-sūtras, we get a glimpse of the knowledge of geometry that the Vedic hindus had. Of all the extant Sulbas, that of the Baudhayana is the biggest and is also, perhaps, the oldest. The Sulbasutras is like a guide to the Vedas which formulate rules for constructing altars. In other words, they provide techniques to solve mathematical problems effortlessly.

It is widely believed that Baudhayana was a priest and an architect of very high standards. It is possible that Baudhayana interest in Mathematical calculations stemmed more from his work in religious matters than a keenness for mathematics as a subject itself. Undoubtedly he wrote the Sulbasutra to provide rules for religious rites, and it would appear almost certain that Baudhayana himself would be a Vedic priest.

Baudhayana was able to construct a circle almost equal in area to a square and vice versa. These procedures are described in his sutras.

To transform a square into a circle ,Baudhāyana says:
" *अयमर्धः करोति समकोणमायामं चतुरश्रस्य वृत्तक्षेत्रम्।* "
Which means "By drawing half (of the diagonal), one can construct a circle equal in area to the square.

Baudhayana is considered among one of the first to discover the value of ‘pi’. There is a mention of this in his Sulba sutras. According to his premise, the approximate value of pi is 3. Several values of π occur in Baudhayana Sulba Sutra, since, when giving different constructions, Baudhayana used different approximations for constructing circular shapes. Some of these values are very close to what is considered to be the value of pi today, which would not have impacted the construction of the altars.

Baudhayana gives the length of the diagonal of a square in terms of its sides, which is equivalent to a formula for the square root of 2. Baudhāyana (elaborated in Āpastamba Sulbasūtra) gives the length of the diagonal of a square in terms of its sides, which is equivalent to a formula for the square root of 2:

"द्विकरणस्य मूलम्" (Dvikaranasya moolam)
"तृतीयेन वर्धयेत्" (Tṛtīyena vardhayet)
"तस्य तृतीयस्य तृतीयः" (Tasya tṛtīyasya tṛtīyaḥ)
"सवर्णं चतुर्थेन च" (Savarnam caturthena ca)

This can be translated as: "The measure of the diagonal (square root of 2) is increased by a third, and then by its own third, less by the thirty-fourth part of that." In modern notation, the expression approximates the value of square root of 2 as:

$\sqrt{2} \approx 1+1/3+1/3\times4-1/3 \times 4 \times 34$

this gives the approximation:

$\sqrt{2} \approx 1.4142156$

Baudhayana listed the Pythagoras theorem in his Sulba sutra as,

"दीर्घचतुरश्रयाक्षणया रज्जुः पार्श्वमानी तिर्यग् मानं च यत् पृथग् भूते कुरुतस्तदुभयं करोति ॥"

which can be translated as "The areas produced separately by the length and the breadth of a rectangle together equal the areas produced by the diagonal.

There is no evidence to suggest that Baudhayana’s formula is restricted to right-angled isosceles triangles so that it can be related to other geometrical figures as well. Therefore it is logical to assume that the sides he referred to, could be those of a rectangle.

We have all heard our parents and grandparents talk of the Vedas. Still, there is no denying that modern science and technology owes its origins to our ancient Indian mathematicians, scholars etc. Many modern discoveries would not have been possible but for the legacy of our forefathers who made major contributions to the fields of science and technology. Be it fields of medicine, astronomy, engineering, mathematics, the list of Indian geniuses who laid the foundations of many an invention is endless.

~Madhusmita Kalita
M.Sc. 3rd Semester

Mathematics in Everyday Life

Mathematics plays an essential role in our everyday lives, making tasks more manageable and efficient. From time management to problem-solving, mathematics is deeply integrated into our routines and enhances our ability to handle complex situations.

Time Management:Mathematics helps us effectively manage time by calculating distances, speeds, and durations. It allows us to plan our schedules, estimate time for tasks, and meet deadlines efficiently. Tracking time and managing project timelines also rely on mathematical principles.

Critical Thinking: Mathematics strengthens critical thinking by developing problem-solving, logical reasoning, and analytical skills. Understanding mathematical concepts, rather than memorizing formulas, allows us to apply these skills in various contexts, from solving equations to analyzing data and making informed decisions.

Stock Market: In the stock market, mathematics is used to analyze trends, predict stock prices, and manage portfolios. Traders rely on statistical models and calculus to make informed decisions, such as calculating the expected returns of an investment.

Geography and Mapping: Mathematics is vital in geography and cartography. Trigonometry and geometry are used to measure distances and create accurate maps. Systems like GPS rely on mathematical algorithms to calculate precise locations.

Cooking and Baking: Mathematics is crucial in the kitchen for measuring ingredients, adjusting recipes, and calculating cooking times. Precision in baking depends on accurate proportions, while nutritional data, such as calories and nutrients, also require mathematical calculations.

In conclusion, mathematics impacts many aspects of life, including architecture, design, shopping, and communication. By improving math skills, we enhance our problem-solving abilities and make informed decisions, improving our overall quality of life.

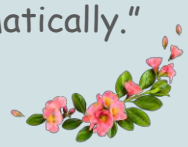
~Afruza Khatun
M.Sc. 1st semester

Mathematics in Technology

Dear reader, have you ever wondered how the mathematics we study is the backbone of technology? If you haven't, then let's delve into the intricate tapestry where mathematics and technology converge, unveiling the profound impact of mathematical concepts on the foundations and advancements of our technological landscape. Let us begin with the use of calculus in technology, Calculus is a branch of mathematics that studies the rate of change; it is used to model systems where there is change. Calculus is integral to machine learning and data science, particularly in optimization, which is key to training models effectively. When building a machine learning model, the goal is to minimize the error between the predicted outputs and the actual outputs. This process involves finding the optimal parameters (like weights in neural networks) that reduce the difference between predicted and actual values. To put it simply calculus gives link of information you want after you type some keywords of the information in the search bar, making the journey between the information and you much smaller.

Now let's explore the use of matrix in technology, it is used in computer graphics and video game development, matrices are used to perform transformations such as scaling, rotation, and translation of 2D and 3D objects making the games we play more fun . Matrices play a crucial role in projecting 3D scenes onto a 2D screen, creating realistic graphics making the movies to reach our phone screen for binge-watching. Next up is Algebra, Algebra is used to design and optimize data structures, such as arrays, stacks, queues, and trees, which are essential for storing and accessing data efficiently in computing systems. Data science heavily relies on linear algebra for manipulating data sets, performing dimensionality reduction(a method for representing a given dataset using lower number of features keep the original data as it is) and optimizing machine learning models. Basically algebra is one of the tool in knowing what your next search on YouTube will be. The use of mathematics in technology is very vast, topics such as geometry plays a crucial role in making the shapes in computer to create different designs to plan how to grasp a shape with a robot arm to video games, topology(Branch of mathematics that focuses on the properties of shapes and spaces that remain unchanged even when they are stretched, twisted, or deformed, as long as they are not torn or glued together.) is used in robotics ,network designing. Till date mathematics continues to fascinate us in various technology and getting to know the mathematics behind the tech we daily use, enables us to appreciate the subject more. So dear reader ,thank you for your time and the next time you use any tech don't forget to appreciate the mathematics behind it.

"No human investigation can be called real science if it cannot be demonstrated mathematically."
– Leonardo Da Vinci



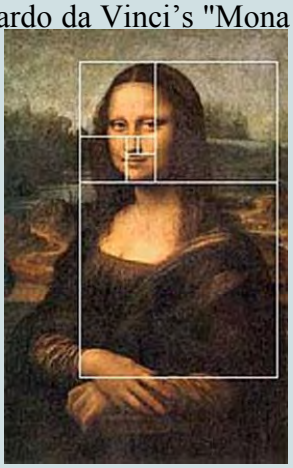
~Pritam Nath
FYUGP 3rd semester

Mathematics and Art: From Ancient Ratios to Modern Illusions

Mathematics and art are related in a variety of ways. Mathematics has itself been described as an art motivated by beauty. Mathematics can be discerned in arts such as music, dance, painting, architecture, sculpture, and textiles.

Mathematics and art are deeply connected. Ancient artists like Polykleitos used mathematical ratios for perfect proportions. In the Renaissance, artists explored the golden ratio and perspective. M. C. Escher used tessellations and complex geometry, while Islamic and modern art incorporate mathematical concepts like symmetry and fractals.

The golden ratio, also known as the divine proportion, is a special number (equal to about 1.618) that appears many times in geometry, art, an architecture. The golden ratio was known to Euclid but is often mistakenly linked to ancient architecture. Its significance in art became prominent after Luca Pacioli's 1509 book "De divina proportione," and it appears in Leonardo da Vinci's "Mona Lisa."



Golden rectangles superimposed on the Mona Lisa

"The book of nature is written in the language of mathematics"

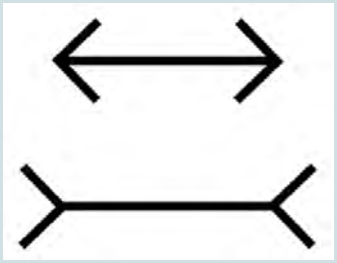
– Galileo Galilei,

Another ratio, the plastic number (around 1.325), was introduced by Dutch architect Hans van der Laan in 1928. He used it in designing the St. Benedictusberg Abbey church, highlighting its unique aesthetic properties and limits of human perception.

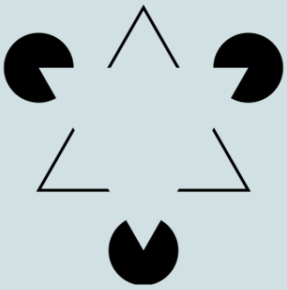
The 1967 St. Benedictusberg Abbey church by Hans van der Laan has plastic ratio proportions.

Building on the influence of mathematical principles in art, it's also important to consider how optical illusions play a role in visual perception. Optical illusions can be categorized based on differences between objects and how they are perceived. These differences might involve intensive properties, such as brightness or color, or extensive properties like location, size, orientation, or depth. Such illusions demonstrate the complex interplay between mathematical concepts and human visual perception, further enriching our understanding of art and geometry.

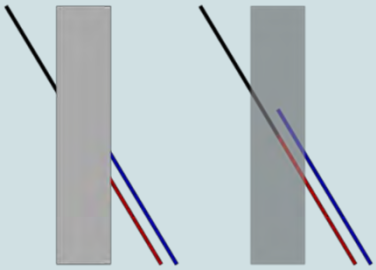
In 1854, German teacher J. J. Oppel introduced the term "Geometrical-Optical" to describe illusions related to geometry. For example, the Müller-Lyer illusion involves length, the Poggendorff illusion involves position, and the Zöllner illusion involves orientation. The Münsterberg illusion, also known as the shifted-chessboard illusion, deals with the straightness of lines. The Delboeuf illusion involves size. These and other illusions show how geometry affects our perception.



The Müller-Lyer illusion is one of the most famous optical illusions in psychology. It consists of two sticks, one framed by closed fins and one framed by open fins. After seeing the illusion, viewers usually estimate that the stick with two open fins is longer, even though the sticks are actually the same length.



When looking at the Kanizsa triangle, one sees the shape of a white, equilateral triangle in the center that appears to occlude the shapes around it. The nonexistent white triangle also appears to be brighter than the surrounding area, but in fact it has the same brightness as the background.

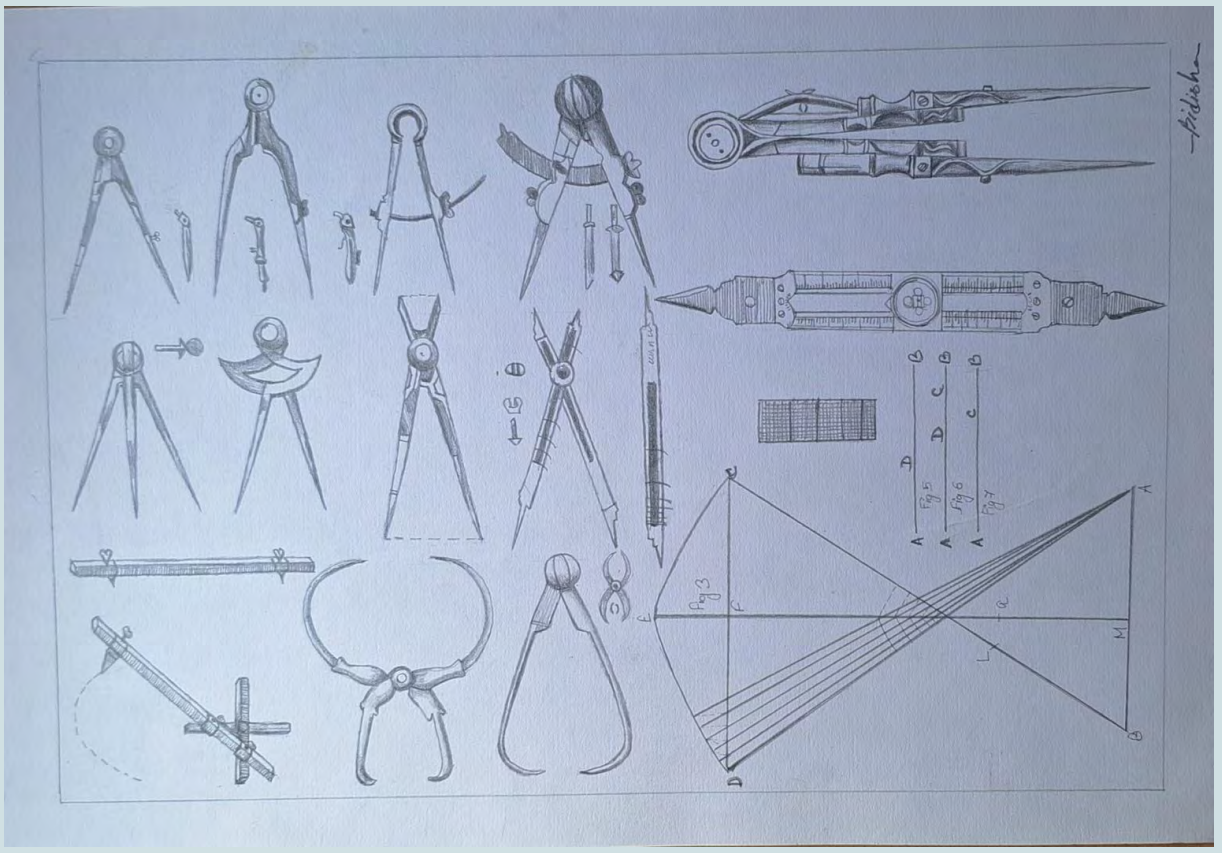


A straight black and red line is obscured by a grey rectangle. The blue line, rather than the red line, appears to be a continuation of the black one, which is clearly shown not to be the case on the second picture. Instead there is an apparent position shift of the lower portion of the line.

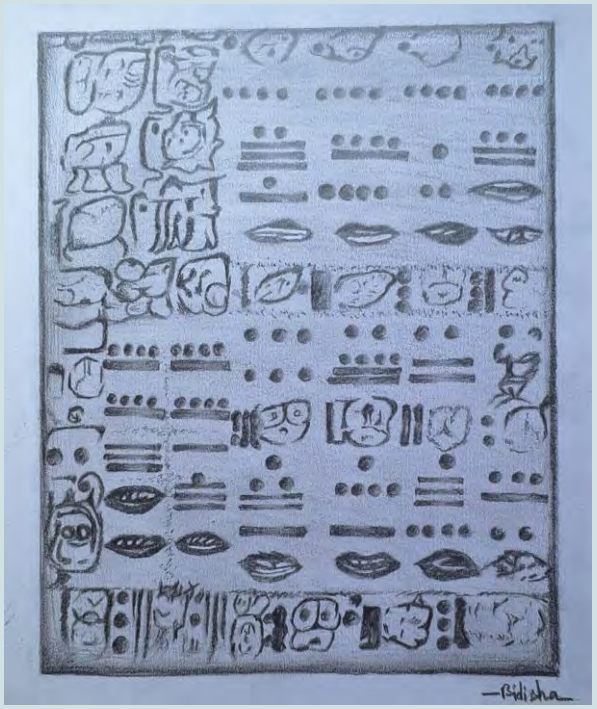
The one below is called Waterfall which looks impossible to exist or work to untrained eyes.

"Waterfall" by M.C. Escher, a Dutch artist

~Banasmita Kalita
M.Sc. 2022-2024 Batch



“MATHEMATICAL INSTRUMENTS” used for all kinds of mathematical calculations .



DRESDEN CODEX: pre-Columbian Mayan hieroglyphic texts known to have survived the book burnings by the Spanish clergy during the 16th century (others include the Madrid, Paris, and Grolier codices). It contains astronomical calculations—eclipse-prediction tables, the synodical period of Venus—of exceptional accuracy.

All art pieces drawn by :

~Bidisha Rabha
FYUGP 3rd semester

Beauty Through the Eyes of Mathematicians

"**B**eauty is the first test : there is no permanent place in this world for ugly mathematics ."

- *G.H. Hardy*

Mathematics has always been more than just numbers and equations. For mathematicians, it is a canvas filled with symmetry, pattern and structures that resonate with an unparalleled elegance.

Take for example, the Fibonacci Sequence, whose numbers create the beautiful spiral we see in seashells, flowers and even in galaxies was found by Leonardo Fibonacci, who used correct axions, definitions carefully like selecting correct colors and showed the world the beauty of mathematics.

Similarly the Golden Ratio, a profound mathematical proportion, founded by Euclid is now found in beautiful architecture, structure, nature and even in human faces.

Mathematics transcends cultures and languages making it a universal language of beauty. The equations such as "$E=mc^2$" from *Einstein* or the pythagorean theorem hold the beauty in itself.

Indian mathematician, Srinivasa Ramanujan who made groundbreaking contributions to mathematical analysis, had belief in the divine beauty of numbers. His work illustrates the beauty of numbers and that the beauty of mathematics is not universal but deeply personal.

Kurt Godel, a Austrian mathematician showed that there are statements that are true but cannot be proven, popularly known as Incomplete Theorems. It displays the paradoxical beauty of mathematics, showing that beauty is not only what we can prove but also the mysteries that remain unsolved.

In conclusion, for mathematicians, beauty is a guiding principle, not merely an afterthought. From ancient philosophers of Pythagoras to modern Ideals of Godel, every mathematician have always sought the beauty of mathematics, be it in the elegance, symmetry of structures or the mystery in the complexity of the theorems or the unveiling truths of the universe.

~Shankarjyoti Sarkar
B.Sc 5th semester

The Mandelbrot Set: A Journey into the Infinite

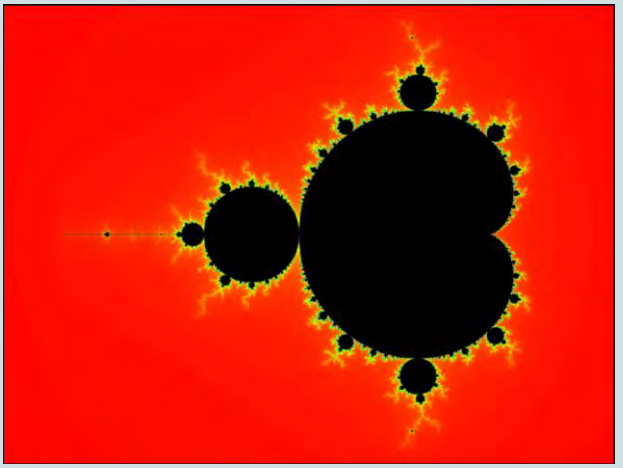
The Basics of the Mandelbrot Set: The Mandelbrot set is a two-dimensional set with a relatively simple definition that exhibits great complexity, especially as it is magnified. The Mandelbrot set, named after mathematician Benoît Mandelbrot, is one of the most famous and beautiful examples of mathematical fractals. It is popular for its aesthetic appeal and fractal structures.

Defined in the complex plane, The Mandelbrot set consists of all complex numbers c for which the sequence generated by the iterative function

$$f_c(z)=z^2+c$$

remains bounded (does not tend to infinity) when starting from $z= 0$. The process involves repeatedly squaring the current value and adding the constant c. If the sequence remains bounded after many iterations, c is considered part of the Mandelbrot set. If the values grow indefinitely, c is not in the set. Julia sets and the Mandelbrot set are intrinsically connected through the fact that they are created using the same formula. While the Mandelbrot set is created using different values on c and an initial value of $z= 0$, a Julia set is created using a fixed c as seed and different values on z. The complex number c can be chosen freely. If the point c chosen does not belong to the Mandelbrot set, the resulting fractal will be a Cantor dust fractal. The relationship between the two sets provides insights into the stability of dynamical systems.

The concept of fractals was not widely recognized until the late 20th century, even though some of the foundational ideas were laid out earlier by mathematicians like Georg Cantor and Felix Klein. Benoît Mandelbrot, working at IBM in the 1970s, popularized the set through his explorations of complex numbers and their visual representations. The release of his book, *The Fractal Geometry of Nature* (1982), brought attention to fractals, showcasing how they occur in nature and various scientific fields.



Explore the Infinite loop of Mandelbrot Set

Visualizing the Mandelbrot Set: The fascinating aspect of the Mandelbrot set is its self-similarity at various scales. When you zoom in on the boundary of the set, you encounter intricate patterns that resemble the whole set, a property characteristic of fractals. The Mandelbrot set is actually a great example of how you can store an infinite amount of information on a finite medium.

The beauty of the Mandelbrot set lies in its visual representation. When plotted on a complex plane, the boundary of the set reveals an array of colorful, swirling patterns. The interior is typically colored black, representing the points in the set, while the exterior can be colored based on how quickly the iterates escape to infinity. This coloring can create a stunning, almost psychedelic display that has captivated artists and scientists alike.

Various software tools and algorithms have made it easier to visualize the Mandelbrot set. The famous "zooming" animations, where one can delve deeper into the patterns, reveal the infinite complexity and unexpected similarities within different regions of the set.

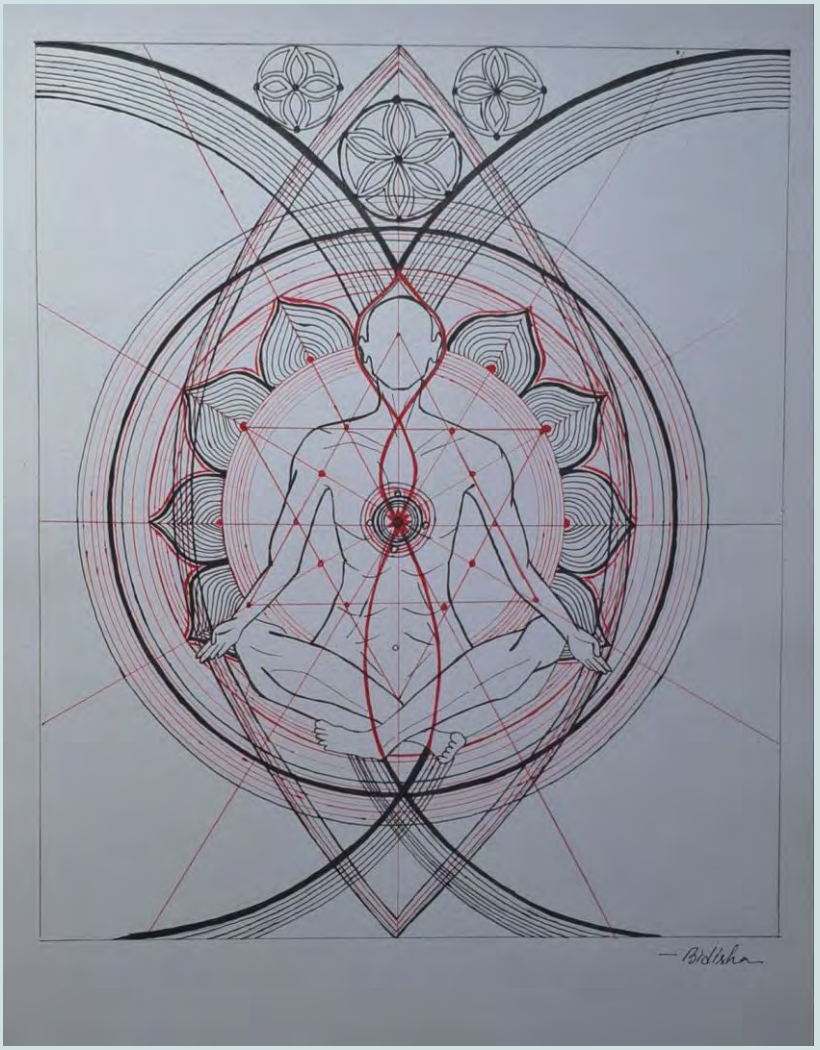
Applications of the Mandelbrot Set : The Mandelbrot set is more than just a pretty picture; it has significant implications in complex dynamics and chaos theory, illustrating how a simple iterative process can lead to unpredictable behaviors. Its principles are applied in various fields such as physics, computer graphics, biology, and finance. For example:

- **Computer Graphics:** The algorithms developed to render the Mandelbrot set are utilized in creating realistic textures and landscapes in digital art and video games.
- **Nature and Biology:** The fractal patterns observed in the Mandelbrot set can be seen in natural phenomena such as coastlines, clouds, and branching patterns in trees and blood vessels.
- **Signal Processing:** Techniques inspired by fractals, including those derived from the Mandelbrot set, can be applied in analyzing signals and noise reduction.
- **Cryptography**: Some algorithms in cryptography use principles from fractal mathematics, providing secure methods for data encryption.
- **Art and Design**: Artists and designers often draw inspiration from the unique shapes and patterns of the Mandelbrot set for various creative projects.

The Mandelbrot set is a beautiful mix of art and math, showing how simple rules can create amazing and complex patterns. As you look closer, you see endless designs that remind us of the intricate structures in our universe, often hiding in plain sight. It is a wonderful example of how beauty can emerge from complexity.

~Dr. Karabi Rajbangshi
Assistant Professor

Sacred Geometry



Sacred geometry attributes symbolic and sacred significance to specific geometric shapes and proportions, linking them to the belief in a divine creator as the universal architect. This concept has been applied in the design and construction of religious structures like churches, temples, mosques, and sacred spaces, such as gardens and wells. Ancient civilizations, including the Egyptians, Greeks, and Romans, used sacred geometry in their architecture, while medieval European cathedrals often incorporated geometric symbolism. In Indian and Himalayan traditions, mandalas and yantras served as foundational design elements for spiritual structures and gardens .

Art by: Bidisha Rabha, FYUGP 3rd semester

Leonardo da Vinci's Vitruvian Man, based on Vitruvius' writings, reflects sacred geometry application to the human body. Medieval cathedrals, often designed with geometries to inspire a mathematical and divine worldview, commonly featured Latin Cross floor plans. In the High Middle Ages, Christian philosophers interpreted the universe using microcosm analogies. Hildegard of Bingen described visions of a human figure within a circle, symbolizing Christ and the cosmos. Dante's Divine Comedy also used circular forms to represent the layers of hell and heaven, reflecting cosmological ideas rooted in ancient astronomy. In Hinduism/ Indic Religion - The Agamas are a collection of Sanskrit, Tamil, and Grantha scriptures that provide guidelines for temple construction, idol creation, worship, and philosophical practices. These texts outline detailed rules for Shilpa (sculpture), covering temple locations, image dimensions, materials, air circulation, and lighting. Works like the Manasara and Silpasara elaborate on these rules. Hindu temples reflect the cosmic model through Vastu Shastra principles, particularly Sukha Darshan, where smaller parts replicate the whole structure. This repetition mirrors fractal patterns found in nature, creating proportional elements that embody sacred geometry in temple design.

For more ART visit -

Sacred Geometry Paintings

~Sourav Kalita
B.Sc 5TH SEM

Tragic Stories in Mathematics

The Story of Évariste Galios: Évariste Galois, a brilliant French mathematician, was born in 1811. His work on group theory and abstract algebra would revolutionize mathematics, but his life was marked by tragedy. Galois's father, a kind and gentle man, died when Évariste was just 17. This devastating loss sparked a downward spiral of depression and rebellion. Galois became involved with radical political groups, leading to his expulsion from school and imprisonment. Despite these challenges, Galois continued to work on his groundbreaking mathematical theories. However, his submissions to the French Academy of Sciences were repeatedly rejected, leading to feelings of frustration and despair. In 1832, at just 20 years old, Galois was challenged to a duel over a romantic dispute. Knowing he would likely die, Galois spent the night before the duel frantically writing down his mathematical discoveries, fearing they would be lost forever. The duel ended in tragedy – Galois was fatally shot, and his mathematical genius was silenced. However, his work lived on, and his contributions to mathematics would later be recognized as revolutionary.

The Story Behind Fermat's Last Theorem: Pierre de Fermat, a French mathematician, famously claimed in 1637 to have a proof for his Last Theorem, which states: "There are no integer solutions to $a^n + b^n = c^n$ for $n>2$." However, Fermat's proof was never found, and his claim remained unverified for over 350 years. The tragedy lies in Fermat's untimely death in 1665, without revealing his proof. His notes and manuscripts were lost or destroyed, leaving behind only a cryptic margin note in his copy of Diophantus' Arithmetica: "I have a truly marvelous proof of this proposition, which this margin is too narrow to contain." Generations of mathematicians struggled to find Fermat's proof, but it remained an enigma. The search for the proof became an obsession, driving some mathematicians to madness and despair. Andrew Wiles finally proved Fermat's Last Theorem in 1994, but the journey was long and arduous. Wiles himself described the experience as "a tragic story" of obsession and sacrifice.

The Story of Kepler's Conjecture: Johannes Kepler, a German mathematician, proposed his conjecture in 1611: "The most efficient way to pack spheres in 3D space is in a pyramid-shaped arrangement, known as a face-centered cubic lattice." Kepler's conjecture remained unproven for over 380 years, despite the efforts of many mathematicians. The tragic story involves:- Thomas Hales, who spent 10 years working on a proof (1992-2002). Hales' proof relied on complex computer simulations, which introduced a new level of rigor but also controversy. The mathematical community struggled to verify the proof due to its reliance on computers. Hales' work was finally accepted in 2014, but the journey took a toll on his mental health.
Additionally, the story involves:- The struggles of mathematicians like Carl Friedrich Gauss, who attempted to prove Kepler's conjecture but failed. The impact on mathematicians' lives, as they dedicated years to solving the problem, often at the cost of personal relationships and health.
Kepler's conjecture story highlights the challenges and sacrifices made in pursuit of mathematical truth, as well as the evolving nature of mathematical proof in the age of computers.

The Story of Ramanujan in Number Theory and Elliptic Functions: Srinivasa Ramanujan, a self-taught Indian mathematician, made groundbreaking contributions to number theory and elliptic functions. However, his life was marked by tragedy: Ramanujan grew up in poverty, with limited access to education and resources. He suffered from malnutrition, tuberculosis, and other health problems throughout his life. Despite his exceptional talent, Ramanujan faced skepticism and dismissal from some British mathematicians.Ramanujan died at 32, leaving behind a vast, unfinished body of work. In number theory, Ramanujan's tragic story involves: His notes and manuscripts contained many unpublished results, including the famous "Lost Notebook". Many of Ramanujan's conjectures and problems remain unsolved, including the Ramanujan conjecture and the Ramanujan prime. In elliptic functions, Ramanujan's tragic story involves: Ramanujan rediscovered and extended existing results, but his lack of formal education led to duplication of effort. His work on elliptic functions, particularly the "Ramanujan theta function", was left incomplete.
Ramanujan's story highlights the struggles faced by a genius with limited resources and recognition, and the enduring impact of his unfinished work on mathematics.

The Story of Hodge's Conjecture: William Hodge, a British mathematician, proposed the Hodge Conjecture in 1950, a fundamental problem in algebraic geometry. The conjecture relates to the structure of algebraic cycles and has far-reaching implications for mathematics and physics. Hodge himself worked on the conjecture for decades but made little progress. Many brilliant mathematicians attempted to prove the Hodge Conjecture but failed, including luminaries like Grothendieck and Deligne. Despite significant advances, the conjecture remains unsolved, with only special cases resolved.The Hodge Conjecture resolution has significant implications for fields like algebraic geometry, number theory, and theoretical physics. Hodge's conjecture has tantalized mathematicians for over 70 years, with many careers dedicated to its resolution.Brilliant mathematicians have devoted themselves to solving the conjecture, only to face disappointment and frustration.The Hodge Conjecture proof remains an enigma, leaving behind a legacy of unfinished work and unrealized potential. The Hodge Conjecture story serves as a poignant reminder of the challenges and sacrifices made in pursuit of mathematical truth, and the enduring impact of an unsolved problem on the mathematical community.

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Unsolved Mathematical Mysteries

Nature is full of mysteries and so is Mathematics. Mathematics is full of intriguing unsolved problems that challenge even the most brilliant minds. Here are some of the most famous and enduring mathematical mysteries:

Riemann Hypothesis: The Riemann hypothesis is the most important open question in number theory occupying experts for more than 160 years. The problem appeared both in mathematician David Hilbert's groundbreaking speech from 1900 and among the "Millennium Problems" formulated a century later with a million-dollar prize. This conjecture, proposed by Bernhard Riemann in 1859, is one of the most famous unsolved problems in mathematics. It posits that all non-trivial zeros of the Riemann zeta function, a complex function important in number theory, have a real part equal to 1/2. Proving or disproving this hypothesis has profound implications for the distribution of prime numbers. However, recently mathematicians Larry Guth of the Massachusetts Institute of Technology and James Maynard of the University of Oxford have posted a sensational new finding on the preprint server arXiv.org. In the paper, "the authors improve a result that seemed insurmountable for more than 50 years," says number theorist Valentin Blomer of the University of Bonn in Germany.

P vs NP Problem: It's one of the seven "Millennium Prize Problems" . The problem asks whether every problem whose solution can be verified quickly by a computer (in polynomial time) can also be solved quickly by a computer. In other words, it questions whether P (problems solvable in polynomial time) is the same as NP (problems for which a solution can be verified in polynomial time). The P stands for "polynomial time" and refers to problems that can be solved quickly. The NP stands for "nondeterministic polynomial time" and refers to problems that can be verified quickly, but it's not known if they can be solved quickly. The P versus NP problem was first conjectured in the 1950s and formally introduced by American mathematician Stephen Cook in 1971.

Goldbach's Conjecture: Goldbach's conjecture is one of the oldest and best-known unsolved problems in number theory and all of mathematics. It states that every even natural number greater than 2 is the sum of two prime numbers. On 7 June 1742, the Prussian mathematician Christian Goldbach wrote a letter to Leonhard Euler (letter XLIII),in which he proposed the following conjecture: "dass jede Zahl, welche aus zweyen numeris primis zusammengesetzt ist, ein aggregatum so vieler numerorum primorum sey, als man will (die unitatem mit dazu gerechnet), bis auf die congeriem omnium unitatum Every integer that can be written as the sum of two primes can also be written as the sum of as many primes as one wishes until all terms are units." The conjecture has been shown to hold for all integers less than 4×10^18 but remains unproven despite considerable effort.

Hodge Conjecture: This was formulated by the Scottish mathematician William Vallance Douglas Hodge as a result of a work in between 1930 and 1940 to enrich the description of de Rham cohomology to include extra structure that is present in the case of complex algebraic varieties. It received little attention before Hodge presented it in an address during the 1950 International Congress of Mathematicians, held in Cambridge, Massachusetts. One of the Millennium Prize Problems, this conjecture relates to the field of algebraic geometry. It suggests that for certain types of algebraic varieties (geometric objects defined by polynomial equations), certain classes of cohomology classes can be represented by algebraic cycles.

Birch and Swinnerton-Dyer Conjecture: This conjecture, also a Millennium Prize Problem, deals with elliptic curves (curves defined by a specific type of cubic equation) and their rational solutions. It proposes a deep connection between the rank of an elliptic curve (the number of rational points) and the behavior of its L-function. It is named after mathematicians Bryan John Birch and Peter Swinnerton-Dyer, who developed the conjecture during the first half of the 1960s with the help of machine computation. Only special cases of the conjecture have been proven.

Navier-Stokes Existence and Smoothness: The problem concerns the equations governing fluid dynamics, known as the Navier-Stokes equations. The question is whether solutions always exist and whether they are smooth (free of singularities) in three dimensions. In particular, solutions of the Navier–Stokes equations often include turbulence, which remains one of the greatest unsolved problems in physics, despite its immense importance in science and engineering. This is another Millennium Prize Problem.

Collatz Conjecture: Also known as the 3n + 1 problem, it involves a sequence defined as follows: start with any positive integer n. If n is even, divide it by 2; if n is odd, multiply it by 3 and add 1. The conjecture states that no matter what positive integer you start with, you will always eventually reach the number 1. Despite extensive computational evidence supporting this, a general proof is still lacking. It is named after the mathematician Lothar Collatz, who introduced the idea in 1937, two years after receiving his doctorate.The sequence of numbers involved is sometimes referred to as the hailstone sequence, hailstone numbers, or hailstone numerals (because the values are usually subject to multiple descents and ascents like hailstones in a cloud), or as wondrous numbers.

Syracuse Conjecture: It is a variant of the Collatz Conjecture that states that, when a particular sequence rule is applied repeatedly, any positive number eventually reaches a cycle of length 1 or 2. These problems continue to spark debates and inquiries within the mathematical community, and finding answers to them may result in fresh perspectives and mathematical breakthroughs.

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“চুটি বাট বিচাৰি যোৱাতকৈ নিষ্ঠাৰে নিজৰ লক্ষ্যত উপনীত হ'বলৈ চোৱা উচিত।”

– অনুপম শইকীয়া ছাৰৰ সৈতে এটি সাক্ষাৎকাৰ

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১) অসমৰ গোলাঘাটৰ পৰা কেম্ব্রিজলৈ আপোনাৰ বর্ণিল যাত্রাৰ এটি আভাষ ।

<u>উত্তৰ:</u> মোৰ স্কুলীয়া শিক্ষা আৰম্ভ হৈছিল গোলাঘাট চহৰৰ তিনি নং টাউন চান্দমাৰি নিম্ন বুনিয়াদী বিদ্যালয়ত। এতিয়া উভতি চালে দেখা পাওঁ যে সেই স্কুলখনে আমাক এক শৃংখলাবদ্ধভাবে আৰু পৰিপাটিকৈ নিজৰ কামবোৰ আগবঢ়াই লৈ যাবলৈ শিকাইছিল। সৰুতে দেউতাই ধেমালিৰ চলেৰে গণিতৰ সাঁথৰ কিছুমান কৰিবলৈ দিছিল। মোৰ পেহী, জেঠাই আৰু মামায়ো তাত যোগদান দিছিল। এইধৰণৰ চর্চাৰ বাবে গণিত বিষয়টো সৰুৰে পৰাই ৰসাল হৈ পৰিছিল।

পঞ্চম মানৰ পৰা দশমমানলৈ মই গোলাঘাট চৰকাৰী বেজবৰুৱা উচ্চতৰ মাধ্যমিক বিদ্যালয়ত পঢ়িছিলো। সেই বিদ্যালয়ৰ সমূহ শিক্ষক-শিক্ষয়িত্রীৰ পৰা চেনেহমূলক তদাৰকে মোক বিশেষভাবে অনুপ্রাণিত কৰিছিল। মোৰ মামাৰ বন্ধু শ্রদ্ধাৰ জেহিৰুল হুছেইনৰ ওচৰত মই বিশেষভাবে ঋণী। তেখেতে অষ্টম-নৱমমানতে মোক একাদশ-দ্বাদশ শ্রেণী তথা আন আন কিতাপৰ গাণিতিক সমস্যাবোৰ কৰিবলৈ উদগণি দিছিল।

একাদশ আৰু দ্বাদশমানত মই কটন কলেজত পঢ়িছিলো। তাৰপিছত দিল্লীৰ চেইণ্ট ষ্টিফেন্স কলেজত। তাত আমি সমগ্র দেশৰে বহুতো মেধাবী সহপাঠীক লগ পাইছিলো। কলেজখনত মুকলি-মূৰীয়াকৈ বিভিন্ন বিষয়ৰ সন্দর্ভত বৌদ্ধিক চিন্তা-চর্চা-আলোচনা হৈছিল। শিক্ষাগুৰু সকলেও ছাত্র-ছাত্রীৰ স্বকীয় চিন্তা-চর্চা বিকাশৰ ওপৰত গুৰুত্ব দিছিল। পাঠ্যক্রমৰ লগতে ব্যক্তিত্বৰ সর্বাঙ্গীন বিকাশৰ অতি অনুকূল পৰিৱেশ আমি পাইছিলো। কেৱল পাঠ্যক্রমৰ ভিতৰতে সীমাবদ্ধ হৈ যে থাকিব নালাগে কলেজখনত তেনে এক বাতাবৰণ আছিল।

মোৰ কলেজীয়া বন্ধু-বান্ধৱসকলে কোৱাৰ বাবেহে কেম্ব্রিজলৈ যোৱাৰ কথা প্রথমে মনলৈ আহিছিল। তাৰ আগলৈকে মই নিজকে যোগ্য বুলি ভবা নাছিলো। কেম্ব্রিজৰ ট্রিনিটি কলেজত উচ্চ শিক্ষা গ্রহণ কৰিবলৈ মই ৰামানুজন স্কলাৰশ্বিপ লাভ কৰিছিলো। আমি সকলোৱে জানো যে ট্রিনিটি কলেজৰ প্রসিদ্ধ গণিতজ্ঞ প্রফেচৰ হার্ডিৰ আমন্ত্রণক্রমে ৰামানুজন সেই কলেজলৈ গৈছিল। সেয়ে ৰামানুজনৰ স্মৃতিত ট্রিনিটি কলেজে এই স্কলাৰশ্বিপৰ ব্যৱস্থা কৰিছিল গণিতৰ শিক্ষার্থীৰ বাবে। চেইণ্ট ষ্টিফেন্স কলেজৰ তৃতীয় শিক্ষাবর্ষৰ আৰম্ভণিতে মই ট্রিনিটি কলেজলৈ প্রপত্র দাখিল কৰিছিলো। দিল্লী বিশ্ববিদ্যালয়ৰ দ্বিতীয় বার্ষিকলৈকে মোৰ ফলাফল তথা তিনিগৰাকী শিক্ষাগুৰুৰ 'লেটাৰ অৱ ৰিক'মেণ্ডেশ্যন'ৰ ভিত্তিত মই পোনপটীয়া সাক্ষাৎকাৰৰ বাবে প্রাৰম্ভিক বাচনিত উঠিছিলো। চূড়ান্ত বাচনিৰ বাবে সাক্ষাৎকাৰ ল'বলৈ কেইবাগৰাকীও বিশেষজ্ঞ কেম্ব্রিজৰ পৰা দিল্লীলৈ আহিছিল, লগতে কেইগৰাকীমান ভাৰতীয় বিশেষজ্ঞও আছিল।

কেম্ব্রিজত গৈ দেখিছিলো যে পাঠ্যক্রম এক তীব্র গতিত আগবাঢশঢ়ে। প্রতিদিনতে আমি নিজৰ 'কমফর্ট জ'ন'ৰপৰা বাহিৰ ওলাই অধ্যয়ন কৰিব লগা হৈছিল। ইংৰাজৰ একচেণ্টৰ লগত অভ্যস্ত হ'বলৈও অলপ সময় লাগিছিল। খাদ্যাভ্যাসৰ বাবেও আৰম্ভণিতে সমস্যা অলপ হৈছিল। পিছলৈ এসাজ কলেজৰ ডাইনিং হ'লত আৰু এসাজ ৰান্ধি খাবলৈ লৈছিলো। ট্রাইপজ শৈষ হোৱাৰ পিছত কেম্ব্রিজত গৱেষণাও কৰিলো । প্রফেচৰ জন ক'টচক পি এইচ ডিৰ তত্বাৱধক হিচাপে পোৱাটো মোৰ বাবে পৰম সৌভাগ্যৰ কথা আছিল। ৩৫০ বছৰে সমাধান নোহোৱাকৈ থকা ফার্মাৰ অন্তিম উপপাদ্য যিগৰাকী গণিতজ্ঞই ১৯৯৪ চনত প্রমাণ কৰিছিল, সেই এন্দ্রু ৱাইলচ্ ক'টচৰে এগৰাকী প্রাক্তন গৱেষক ছাত্র আছিল। গণিতত তেখেতৰ দখল অতি গভীৰ আৰু অন্তর্দৃষ্টিসম্পন্ন আছিল।

২)এজন গণিতজ্ঞৰ বাবে নিসন্দেহে গণিত এক নিচা । ইয়াৰ কোনটো অংশই আপোনাক গণিতক পেছা হিচাপে ল'বলৈ অনুপ্রাণিত কৰিছিল?

<u>উত্তৰ:</u> আমি যদি ভাল পোৱা বিষয়টো কর্মক্ষেত্র হিচাপে ল'ব পাৰোঁ সেয়া অতি সৌভাগ্যৰ কথা বুলি ভাবিব পাৰি। মোৰ ক্ষেত্রত গণিতকে কর্মক্ষেত্র হিচাপে বাচি লোৱা অতি সহজ আছিল, কিয়নো আন কোনো বিষয়েই মই ইমান ভালপোৱা নাছিলো। গতিকে গণিতৰ লগত জড়িত কাম কেতিয়াও মোৰ বাবে বোজা যেন লগা নাই।

৩) আপোনাৰ দৃষ্টিত গণিত শিকোঁতে ছাত্র-ছাত্রীসকলে কৰা কিছুমান সাধাৰণ ভুল বা ভুল ধাৰণা কি আৰু সেইবোৰ কেনেকৈ এৰাই চলিব লাগে ?

<u>উত্তৰ:</u> গণিতত বিষয়বস্তু মনত ৰখাতকৈ ভালদৰে বুজি লোৱাটো বেছি গুৰুত্বপূর্ণ। সেইদৰে নিজে যুঁজি-বাগি ভাবি-চিন্তি সমাধান উলিওৱা গাণিতিক সমস্যা এটাইহে আমাৰ গাণিতিক চিন্তাৰ বিকাশ বেছিকৈ ঘটায়। প্রথমবাৰ কিতাপৰ সমাধান চাই লৈ পিছত কেৱল অনুকৰণ কৰিবলৈ যোৱাটো গাণিতিক বিকাশৰ বাবে বৰ ফলপ্রসূ বুলিব নোৱাৰি। তদুপৰি ভাল লিখকে লিখা আৰু ভাল পাব্লিশিঙ কোম্পানীয়ে প্রকাশ কৰা গণিতৰ কিতাপ নপঢ়িও বহুতে ভুল কৰা যেন লাগে। গণিত হাতে-কামে লাগি শিকা বিষয়। নিষ্ক্রিয় ভাবে পঢ়িলেও বিশেষলাভ নহয়। গতিকে এনেবোৰ সচৰাচৰ ভুলৰ কথাই মনলৈ আহিছে।

৪) আপোনাৰ গৱেষণাৰ বিষয় আৰু ইয়াৰ তাৎপর্য্যৰ বিষয়ে এটি বিৱৰণ।

<u>উত্তৰ:</u> মোৰ গৱেষণাৰ ক্ষেত্রখন হৈছে বীজগণিতীয় সংখ্যাতত্ব। আমাৰ পৰিচিত অখণ্ড সংখ্যা বা পৰিমেয় সংখ্যাৰ বাহিৰেও এনে বহুতো অপৰিমেয় সংখ্যা আছে যিবোৰৰ বহুখিনি সামঞ্জস্য অখণ্ড বা পৰিমেয় সংখ্যাৰ লগত আছে। সেইধৰণৰ অপৰিমেয় সংখ্যাপ্রণালীবোৰৰ অধ্যয়নেই হৈছে মোৰ গৱেষণাৰ ক্ষেত্রখন। সেইবোৰৰ সাদৃশ্য কিমান পর্যায়লৈকে পৰিমেয় অখণ্ড সংখ্যাৰ লগত আছে আৰু তাৰ পৰিণতি কি এনেবোৰ প্রশ্নৰ পম খেদি যোৱা হয়।

৫)গণিতক কেৰিয়াৰ হিচাপে ল'ব বিচৰা সকললৈ আপুনি কি উপদেশ দিব?

উত্তৰ: গণিত বিষয়টোৰ প্ৰতি বিশেষ অনুৰাগ থকাটো আৱশ্যকীয় বুলি ভাবোঁ। তেতিয়া গণিতৰ অধ্যয়ন আৰু গৱেষণা প্ৰক্ৰিয়াটোৰ আমেজ লৈ আগবাঢ়ি যাব পাৰি। ধৈর্য্যৰ বিশেষ প্ৰয়োজন, লগতে একাণপতীয়াকৈ লাগি থকাব পৰাৰ মানসিকতা। মই ভাবোঁ যে শিক্ষার্থীসকলে নিজৰ সামর্থৰ পূৰ্ণতম প্ৰয়োগ কৰিবলৈ শিকা উচিত। চুটি বাট বিচাৰি যোৱাতকৈ নিষ্ঠাৰে নিজৰ লক্ষ্যত উপনীত হ'বলৈ চোৱা উচিত। গণিতৰ বিষয়বস্তু খৰচি মাৰি বুজি ল'ব লাগে। তাৰপাছত পর্যায়ক্ৰমে অনুশীলনী সমস্যাবোৰ কৰি যাব লাগে,কঠিনৰপৰা কঠিনতৰ প্ৰশ্নবোৰলৈ। নিজকে প্ৰতিদিনে এখোজ হ'লেও আগুৱাই নিব লাগে। জেম, গেট আদিৰ লগতে আগশাৰীৰ শিক্ষানুষ্ঠানবোৰৰ এণ্ট্ৰেন্স পৰীক্ষা, স্কলাৰশ্বিপৰ পৰীক্ষাৰ বাবেও প্ৰস্তুতি চলাই যাব লাগে। দেশৰ বিভিন্ন প্ৰান্তত হোৱা এম্ টি টি এচ, এই এফ এচ্ কে আদি কৰি আয়োজিত হোৱা বিভিন্ন কর্মশালা বোৰত অংশগ্ৰহণ কৰিব লাগে। সেইবোৰত আন আন গণিতৰ অনুৰাগীসকলৰ লগত মত বিনিময় কৰি দিহা-পৰামর্শ লোৱাও অতি প্ৰয়োজনীয়। গ্ৰীষ্মকালীন বন্ধত ইণ্টার্ণশ্বিপৰ বাবে বিভিন্ন প্ৰতিষ্ঠানৰ অধ্যাপকলৈ নৱেম্বৰ-ডিচেম্বৰ মাহতে আবেদন জনাব লাগে। দেশবিদেশৰ বিভিন্ন শিক্ষানুষ্ঠানৰ প্ৰগ্ৰাম, এডমিশ্যন প্ৰক্ৰিয়া, স্কলাৰশ্বিপ আদিৰ বিষয়ে শিক্ষার্থীসকল সজাগ হোৱাৰ প্ৰয়োজন। গণিতত আগ্ৰহী সহপাঠী বা চিনিয়ৰ-জুনিয়ৰৰ লগত যোগাযোগ ৰখাটো প্ৰয়োজনীয়। গণিতৰ চিন্তা-চর্চা কৰি ভাল পোৱা এটা গ্ৰুপ গঠন কৰিল'ব পাৰিলে এক উদ্যম পোৱা যায়।

যুগুতালে : সুস্মিতা দেৱী
স্নাতকোত্তৰ তৃতীয় ষান্মাসিক

এজন গণিতৰ শিক্ষকৰ হাতত ধৰি গণিতৰ জগতখনলৈ

সেয়া আছিল ২০০২ চনৰ কথা । মই তেতিয়া হাইস্কুলৰ অষ্টম শ্ৰেণীলৈ উত্তীৰ্ণ হৈছোঁ ।মোৰ বিদ্যালয়খনৰ নাম আছিল যোৰহাট চৰকাৰী উচ্চতৰ মাধ্যমিক বহুমুখী বালক বিদ্যালয় । ঘৰত দেউতাই কৈছিল, " এতিয়ালৈকে মই যিমান পাৰো পঢ়ালোঁ। এতিয়া টিউচন ল'ব লাগিব। বিশেষকৈ অংক, বিজ্ঞান আদিত । কাৰণ এই তিনিটা বছৰ ভালদৰে নপঢ়িলে ভৱিষ্যত গঢ়াতো কঠিন ।" কথামতেই কাম। স্কুলত লগৰবোৰৰ লগত কথা পাতি ইতিমধ্যেই গম পাইছিলোঁ যে আমাৰ বিদ্যালয়ৰ শ্ৰদ্ধাৰ ভীমকান্ত হাজৰিকা ছাৰে অংকৰ টিউচন কৰে। আমি সপ্তম মানলৈকে তেখেতৰ ক্লাচ পোৱা নাছিলোঁ। ঘৰত কথাটো ক'লোঁ। দেউতাই একে আষাৰতে ক'লে," অ' ভীম ছাৰৰ ওচৰত টিউচন ল'বা নেকি? হ'ব বাৰু। মই এদিন কথা পাতি আহিম।" মোৰ মনটোৱে প্ৰমাদ গণিলে। নতুনকৈ ডেকা হ'বলৈ বিচৰা ল'ৰা। 'সকলো কাম নিজে কৰিম'-এই ধৰণৰ ভাব এটা লাহে লাহে বুকুত গজি উঠিছিল ।এনেও যোৰহাট গভ্টৰ ল'ৰা বুলিলে অলপ বেলেগ পৰিচয় এটা আছিলেই সেই সময়ত। বিশেষকৈ অষ্টম, নৱম শ্ৰেণীৰ নতুনকৈ যৌৱনৰ বতাহ লগা সময়খিনিত যোৰহাট গভ্টৰ ল'ৰাবোৰৰ বেলেগ এটা 'হিৰ'গিৰি' চকুত দেখা যায়। অৱশ্যে শ্ৰেণীৰ 'ভাল ল'ৰা'ৰ শাৰীত মোক ৰখাৰ বাবে নিজে কিছু সাৱধানে চলিব লগা হৈছিল৷ তথাপিও দেউতাক ক'লোঁ,"হ'ব, মই পাৰিম। সকলোৱে নিজে নিজে কথা পাতি লয়। তুমি পইচাটো দিলেই হ'ব।" দেউতায়ো হ'ব বুলি কৈ থৈ দিলে ।জানুৱাৰী মাহৰ মাঘ বিহুৰ পিছতে কোনোবা এটা দিনত মোৰ টিউচন যোৱা দিনটো আহিল। নতুনকৈ কিনা হিৰ' ৰয়েল চাইকেলখন লৈ পুৱা ছয় বজাতে টিউচনলৈ বুলি ঢাপলি মেলিব লাগে ।আজিৰ পৰা ২২ বছৰৰ আগত বতৰৰ বহুত পাৰ্থক্য আছিল ।পুৱা ছয় বজাতো কুঁৱলীৰ বগা আচ্ছাদনৰ পৰা ৰাস্তা একোকে নমনি৷ ঠেৰেঙা লগা জাৰত এখন হাত পেন্টৰ পকেটত ভৰাই এখন হাতেৰে চাইকেলৰ হেণ্ডেল ধৰি মুখেৰে ধোঁৱা উলিয়াই কোনোমতে আহি আছোঁ। ইমান কুঁৱলী যে চকুৰ পতাত পৰি চকু জাপ খাই যোৱাৰ দৰে অৱস্থা। মনতে ভাবিছিলোঁ হাইস্কুলৰ অংকৰ জগতখনো ছাগে এনেকুৱাই হ'ব। ধুৱলী-কুঁৱলী, ৰহস্যময় ।কুঁৱলীৰ মাজৰ পৰা ঘপ্কৈ ওলাই দিয়াত ৰাস্তাত থকা কুকুৰেও উচপ খাই ভালকৈয়ে খেদন এটা দিয়াত দুইহাতেৰে ধৰি চাইকেল কোবাই গৈ টিউচনৰ স্থলী পালোগৈ ।যথাসময়ত ছাৰ আহিল । গলগলীয়া মাতেৰে ছাৰজনক প্ৰথম দেখাতেই শ্ৰদ্ধা আৰু ভয়ভাব একেলগে আহে ।প্ৰথম দিন বাবে তেওঁ গোটেই বছৰটোত কি কি পঢ়িব লাগিব তাৰ এটি আভাস দিলে । মাজতে তেওঁ ঘপ্কৈ কৈ উঠিল," অ' ইয়াত ইন্দ্ৰেশ্বৰ বৰুৱাৰ ল'ৰা কোনটো?" মোৰ বুকুখন ধম্কৈ মাৰিল ।ছাৰে আকৌ মোৰ কথা কেনেকৈ জানিলে ! লাহেকৈ থিয় হ'ব লগা হ'ল । টিউচনৰ বাবে যোৰহাট চৰকাৰী বালিকা বিদ্যালয়ৰো বহুত ছোৱালী আহিছিল ।আমাৰখন বালক বিদ্যালয় আছিল বাবে অলপ জনা হোৱাৰ পিছত বালিকাৰ লগত একে কোঠাত বহি কৰা সেইটোৱেই আমাৰ প্ৰথম ক্লাচ আছিল। এনে লাগিল যেন গোটেইমখা ছোৱালীয়ে মোলৈকে চাই আছে ।কাণ-মূৰ ৰঙা পৰি গ'ল ।

“ কি নাম আছিল তোৰ ?”
“ছাৰ! চঞ্চল বৰুৱা।”
“অ ! পঢ়াত চঞ্চল হ’লে নহ’ব। ভালকৈ পঢ়িবি।সপ্তম শ্ৰেণীত তোৰ ৰিজাল্ট ভাল হোৱা বুলি ক’লে দেউতাৰে।তোৰ দেউতাৰকো মই পঢ়াইছিলোঁ সৰুতে। গোলাঘাটৰ গাঁৱৰ স্কুলত।”
দেউতাই যে আগতেই ক’ৰবাত ছাৰক লগ ধৰিলে কথাষাৰৰ তত্ তেতিয়াহে ধৰিব পাৰিলোঁ।সকলোৰে মুখত মৃদু হাঁহি এটা বিয়পি যোৱাৰ ভাব এটা থিয় হৈ থাকিয়েই অনুমান কৰি মোৰ সেইদিনা অৱস্থা ফাঁট মেলা বসুমতী পাতালে লুকাও যেন হৈছিল।ছাৰে বহিবলৈ কৈ আৰম্ভ কৰিছিল,“ তহঁতে এইবাৰ বীজগণিতো অলপমান পাবি।অংকত যে x ধৰি পিছত x ৰ মান উলিয়াব লাগে সেইবোৰ অংক ; এই ধৰি ল’–এজাক চৰাই উৰি আহি আছিল। বাটতে আন এজাক চৰাইক লগ পালে। ইটো জাকৰ এটা চৰায়ে আনটো জাকৰ এটা চৰাইক সুধিলে যে তোমালোকৰ জাকটোত কিমান আছা৷ উত্তৰত আনটো জাকৰ চৰাই এটাই ক’লে,“ তোমালোক যিমান আহিছা তাৰ আধাৰ লগত আমাৰখিনি যোগ দিলে তোমালোকৰ সমানেই হ’ব।” যদি দুয়োটা জাকতে মুঠ ২১ টা চৰাই আছিল তেন্তে তহঁতে বিচাৰি উলিয়াব লাগিব কোনটো জাকত কিমান চৰাই আছিল৷” সৰুৰে পৰা চৰাই-চিৰিকটি ভাল পোৱা, ঘৰৰ সন্মুখত চৰাইয়ে বাহ সাজিলে কুটা কঢ়িওৱাৰ পৰা গোটেই বাহটো সজা হোৱালৈকে চাই বহি থকা মোৰ কৈশোৰ মনটোত প্ৰশ্নটোৰে বাৰুকৈয়ে প্ৰভাৱ পেলালে। এনেকৈ যদি প্ৰশ্নবোৰৰ সমিধান উলিয়া ব পাৰি ! গণিতৰ ৰহস্যময় জগতখনলৈ যেন সেই প্ৰশ্নটোৰেই মোক আদৰণি জনালে। আৰু বা কিমান ৰহস্য আছে গণিতৰ পৃথিৱীখনত ! সেই প্ৰথম দিনাৰে পৰা ছাৰৰ টিউচনৰ এটা বেলেগ সোৱাদ পালোঁ, যি হয়তো আজিলৈকে মোক গণিতৰ পৃথিৱীখনৰ সৈতে সংযুক্ত কৰি ৰাখিলে। আজিৰ তাৰিখত নিজে এজন গণিতৰ শিক্ষক হোৱাৰ পিছত সেইবাবেই মনত ভাব হয় যে গণিতৰ প্ৰতি ল’ৰা-ছোৱালীৰ মনত যি অহেতুক ভয় সৰুতেই সোমোৱাই দিয়া হয় যে গণিত বৰ জটিল বিষয়, ভালকৈ নপঢ়িলে ফেইল ইত্যাদিৰ সলনি শৈশৱ-কৈশোৰ অৱস্থাত তেওঁলোকে যিবোৰ বিষয় ভাল পায়, সেইবোৰৰ লগত গণিতক সংযোগ কৰি বিষয়টোক আকৰ্ষণীয়কৈ ছাত্ৰ-ছাত্ৰীৰ আগত তুলি ধৰিবলৈ শ্ৰদ্ধাৰ ভীমকান্ত হাজৰিকা ছাৰৰ দৰে একো একোজন শিক্ষকৰ প্ৰয়োজন। যাৰ হাতত ধৰি ছাত্ৰ ছাত্ৰীসকল গুচি যাব পাৰে গণিতৰ আমোদজনক পৃথিৱীখনলৈ...

(সংযোজন: হাইস্কুলৰ ভীমকান্ত হাজৰিকা ছাৰৰ উপৰিও মহাবিদ্যালয় পৰ্যায়ৰ দীপক শৰ্মা ছাৰ, নৱকান্ত শৰ্মা ছাৰ, বিশ্ববিদ্যালয় পৰ্যায়ৰ গোপাল চন্দ্ৰ হাজৰিকা ছাৰ, অংকুৰ ভঁৰালী ছাৰ, চন্দ্ৰ চুতীয়া ছাৰৰ দৰে গণিত শিক্ষক সকলক শ্ৰদ্ধাৰে সুৰঁৰি...)

~ড° চঞ্চল বৰুৱা
সহকাৰী অধ্যাপক
গণিত বিভাগ

ক্ৰীড়াত গণিত : খেলৰ আঁৰৰ সংখ্যাবোৰ

সকলো ক্ৰীড়া সংখ্যাৰ ওপৰত নিৰ্ভৰশীল! ফুটবলৰ পৰা আৰম্ভ কৰি দবা পৰ্যন্ত প্ৰায় সকলো খেলতেই গণিতৰ প্ৰয়োজন।

এজন খেলুৰৈৰ প্ৰদৰ্শন গণনা, বিশ্লেষণ, তুলনা আৰু বৃদ্ধি কৰাৰ বাবে গণিত ব্যৱহাৰ কৰা হয়। সকলো খেলেই পৰিসংখ্যা আৰু মৌলকক্ষ ওপৰত নিৰ্ভৰশীল, যাৰ সহায়ত খেলপথাৰৰ ভিতৰত আৰু বাহিৰত খেলুৰৈ এজনৰ প্ৰদৰ্শন গণিব পাৰি। গণিত হৈছে ফুটবল, ক্ৰিকেট, বেডমিন্টনকে আদি কৰি সকলো আধুনিক খেলৰ এক অবিচ্ছেদ্য অংশ।

যদি আপুনি এজন ছাত্ৰ-ক্ৰীড়াবিদক তেওঁৰ প্ৰিয় খেল বা খেলুৰৈৰ বিষয়ে কিছু পৰিসংখ্যা দিবলৈ কয়, তেওঁ সম্ভৱতঃ বেটিং গড় (ক্ৰিকেট), DVOA (ফুটবল) আদি তথ্য উলিয়াই দিব পাৰিব। এই ছাত্ৰ-ছাত্ৰীসকলক এইবোৰৰ অৰ্থ কি আৰু কেনেকৈ গণনা কৰা হৈছে বুলি সুধিলে হয়তো ধাৰণাবোৰ বিশ্লেষণ কৰাত কোনো অসুবিধা নাপাব।

ক্ৰীড়া আৰু গণিতৰ সংযোগস্থল : গণিতে ক্ৰীড়াৰ বিভিন্ন দিশত উল্লেখযোগ্য ভূমিকা পালন কৰে। তাৰে কিছুমান মূল ব্যৱহাৰ হ'ল:

পৰিসংখ্যা আৰু তথ্য বিশ্লেষণ: ফুটবল, বাস্কেটবল, ক্ৰিকেট আদিৰ দৰে খেলত পৰিসংখ্যা (যেনে খেলুৰৈৰ গড়, গ'ল, এছিষ্ট আদি) ,প্ৰদৰ্শনৰ মূল্যায়ন আৰু সিদ্ধান্ত ল'বলৈ ব্যৱহাৰ কৰা হয়। উদাহৰণস্বৰূপে:

ক্ৰিকেটৰ ক্ষেত্ৰত, ধৰা হ'ল এজন বেটছমেনে তেওঁৰ কেৰিয়াৰত মুঠ ১২৩খন খেলৰ ১১০টা ইনিংছ বেটিং কৰি সৰ্বমুঠ ৫৩৬৪ ৰাণ সংগ্ৰহ কৰিছে আৰু এই ১১০টা ইনিংছৰ ভিতৰত তেওঁ ১৬টা ইনিংছত নট আউট আছিল। তেতিয়া তেওঁৰ বেটিং গড় উলিয়াবলৈ ব্যৱহাৰ কৰা গাণিতিক সূত্ৰটো হ'ল -

(সৰ্বমুঠ ৰাণ)/(খেলা মুঠ ইনিংছ - নট আউট থকা ইনিংছৰ সংখ্যা)

গতিকে, উপৰোক্ত সূত্ৰটো ব্যৱহাৰ কৰি আমি পাওঁ যে বেটছমেনজনৰ কেৰিয়াৰ বেটিং গড় হ'ব= ৫৩৬৪/(১১০-১৬) = ৫৭.০৬ ।

গাণিতিক আৰ্হি ব্যৱহাৰ কৰি বিভিন্ন কাৰকৰ ওপৰত ভিত্তি কৰি খেলুৰৈ আৰু দলসমূহক ৰেংকিং কৰা হয়(যেনে তেওঁলোকৰ ঐতিহাসিক প্ৰদৰ্শন আৰু বৰ্তমানৰ ৰূপ) ।

তাৰোপৰি ফেণ্টাচি স্প'টছ লীগসমূহেও খেলুৰৈৰ মূল্য আৰু ফলাফল নিৰ্ণয় কৰিবলৈ পৰিসংখ্যাগত তথ্য আৰু গাণিতিক সম্ভাৱনাৰ ওপৰত বহু পৰিমাণে নিৰ্ভৰ কৰে।

গেম ডিজাইনত জ্যামিতি: ক'ৰ্ট, খেলপথাৰ, খেলপথাৰৰ মাত্ৰা আৰু আকৃতি (যেনে, বাস্কেটবল ক'ৰ্ট বা ফুটবল খেলপথাৰ আদি) জ্যামিতিৰ নীতি ব্যৱহাৰ কৰি নিৰ্ধাৰণ কৰা হয়।

বলবোৰ পাছ কৰা বা শ্বট কৰা কোণবোৰ জ্যামিতি আৰু ত্ৰিকোণমিতি সহায়ত বিশ্লেষণ কৰি কাৰ্য্যক্ষমতা অনুকূল কৰিব পাৰি।

পদার্থ বিজ্ঞান আৰু গতিবিজ্ঞান: ক্রীড়াত বল, খেলুৰৈ বা সঁজুলিৰ গতি গতিবিদ্যা আৰু গতিবিদ্যাৰ নীতিৰ দ্বাৰা পৰিচালিত হয়। উদাহৰণস্বৰূপে বলৰ ট্রেজেক্টৰী গণনা কৰিবলৈ গতি আৰু বলটোৰ ওপৰত ক্রিয়া কৰা বলৰ সমীকৰণ জড়িত হৈ থাকে। বায়ুৰ প্রতিৰোধ ক্ষমতা, স্পিন আৰু বাউন্সৰ আৰ্হি তৰল গতিবিদ্যা (Fluid dynamics) আৰু অৱভেদ্য সমীকৰণ (Differential equation) ব্যৱহাৰ কৰি কৰিব পাৰি।

সম্ভাৱিতা: খেলৰ ফলাফলৰ ভৱিষ্যদ্বাণী কৰিবলৈ ক্রীড়া পণত গাণিতিক আৰ্হিৰ প্রচণ্ড ব্যৱহাৰ কৰা হয়। সম্ভাৱনাসমূহ বিভিন্ন ঘটনাত নিযুক্ত কৰা হয়, আৰু বাজি ধৰাসকলে এইবোৰ ব্যৱহাৰ কৰি জ্ঞাত সিদ্ধান্ত লয়।

সময়সূচী আৰু প্রতিযোগিতাৰ নক্সা: কোনো এখন খেলৰ কার্যক্ষম টুর্ণামেণ্ট সূচী (যেনে ৰাউণ্ড-ৰবিন আৰু নকআউট পর্যায়) ডিজাইন কৰাত গণিতে সহায় কৰে যিয়ে সংঘাত, ভ্রমণৰ সময় কম কৰে আৰু ন্যায্যতা সর্বাধিক কৰে।

আঘাত প্রতিৰোধ: গাণিতিক আৰ্হিসমূহে কোনো এজন খেলুৰৈৰ কামৰ বোজা, জিৰণিৰ সময়, আৰু খেলৰ ধৰণৰ দৰে কাৰকৰ ওপৰত ভিত্তি কৰি আঘাতৰ আশংকা ভৱিষ্যদ্বাণী কৰিব পাৰে, যাৰ ফলত প্রতিৰোধৰ উন্নত কৌশলত সুবিধা হয়।

গণিতে এনেদৰে কেৱল ক্রীড়াৰ বুজাবুজিয়েই নহয়, প্রদর্শন আৰু কৌশলগত উপাদানসমূহো বৃদ্ধি কৰে যাৰ ফলত আধুনিক ক্রীড়াবিদৰ বাবে গণিত অপৰিহার্য হৈ পৰে।

~প্রজ্ঞান কলিতা

স্নাতকোত্তৰ তৃতীয় ষান্মাসিক

Some Mathematical Poems :

Mathematical Journeys

Mathematics, the subject that gives chill,
But people love it still.
For it is fascinating,
It makes the world a bit more interesting.

Ask geometry where shapes tell stories,
Or logarithm where big calculations are of no worries.
Explore real analysis where limits sing,
Where convergence or divergence is the king.

Dive into number theory where numbers glow,
Creating a great adventurous show.
Sin ,cos and Tan are the best trio,
And trigonometry is there studio.

Topology twists shapes like clay,
A world where forms transform and play.
Algebra uncovers what's hidden away,
Making unknowns clear as day.

Statistics whispers tales of chance,
Solving data's complex dance.
With MATLAB, LaTeX, and GeoGebra too,
Bring your math dreams alive and new.

Look for maths, you will find it somewhere,
For maths is everywhere.
So let your curiosity flow,
And all the best as you let your knowledge grow.

~Pritam Nath
FYUGP 3rd semester

জীৱন এক গণিত

জীৱনটো এক গণিত
য'ত উশাহ - নিশাহ বোৰ বিয়োগ হয়
অভিজ্ঞতা যোগ হয়।
জীৱনৰ উঠা-নমাবোৰে সৃষ্টি কৰে
কিছুমান সমীকৰণ,
কেতিয়াবা নিজৰ মাজতে আউল লাগে
আকৌ বিচাৰি লয় সমাধানৰ নতুন পথ।

কেতিয়াবা যদি সুখৰ বিন্দু পাওঁ
কেতিয়াবা আকৌ পাওঁ বক্ৰৰ দৰে দুখ।
কাহিনীবোৰে টো খেলে
এবাৰ ওপৰলৈ এবাৰ তললৈ
সীমাহীন পৰিধি যাৰ।
জীৱনটোৱেই এক গণিত
সমাধান বিচাৰি
হাহাকাৰ।

- জ্যোতিস্মা দাস
FYUGP প্ৰথম ষান্মাসিক

অংকৰ জটিলতা:

সকলো সময়তে মগজুত চলি থাকে হিচাপ-নিকাচৰ অংক,
গণিত অবিহনে যেন আজিৰ পৃথিৱী নিমিষতেই ধ্বংস।
আমাৰ বাবে কামোৰ এই বীজগণিত আৰু ত্রিকোনমিত্রি,
অংকবোৰেহে দিয়ে আমাক জীৱনৰ আচল জুতি।
নাজানো কিয় সংখ্যাবোৰ দেখিলেই
মূৰ ঘূৰাই
পঢ়া টেবুলত বহি গৈ পাওঁ আমেৰিকা আৰু ডুবাই।
অংকবোৰেই দিয়ে আমাক জীৱনৰ লাভ-লোকচানৰ হিচাপ,
তথাপিও কিয় মেলিলেই ভাগৰ লাগে মোৰ ভাল ভাল গণিতৰ কিতাপ।
গণিত মাথোঁ এটি বিষয় নহয় , ই যেন জীৱনৰ এটি অংশ,
অংকৰ জটিলতাই কৰিব খোজে মোৰ একেবাৰে জীৱনেই ধ্বংস।
যদিও দেখো কিতাপ মেলিলেই
মই ফুল সৰিয়হৰ,
তথাপিও হৈ ৰ'ব মোৰ অংকশাস্ত্রই প্রিয়

~ৰাজদীপ কুমাৰ শর্মা
FYUGP প্রথম ষান্মাসিক

গণিতৰ মায়াময় পথ

গণিত নহয় মাথোঁ বিষয় এটি
গণিত মায়াময় গণিত ৰহস্যময়,
ই এক আবেগ,
যিয়ে মোক আঁতৰাই ৰাখে পদার্থ আৰু ৰসায়ন
বিজ্ঞানৰ জটিল মেৰ-পাকৰ পৰা।
গণিতৰ সতে মোৰ সম্পর্ক ইমান গভীৰ , ইমান ৰসিক যে
ই মোক বান্ধি ৰাখে এৰাব নোৱাৰা এক অদৃশ্য জৰীৰে ।
যিদিনাৰ পৰাই গণিতৰ বাটেৰ বাট বুলিলো
সিদিনাৰ পৰাই অনভুৰ কৰিছিলো
ঘড়ীৰ কাঁটাডালৰ পৰা কুকাৰত মৰা হুইছেলটোলৈকে
সকলাতে গণিত বিৰাজমান।
'আকাশখন শূন্য 'বুলি কওঁতেও গণিতৰ এই
শূন্য অংকটোৰে প্রয়োজন।
বাঢ়ি অহা বয়সৰ হাত-ধৰি মোৰ আগ্রহ ও দুগুণে বাঢ়িছিল
কোণ, বাহু ,ত্রিভূজৰ নানাৰঙী ছবিবোৰে
মোৰ সপোনক অলংকাৰ পিন্ধাইছিল।
এনেকৈয়ে সোমাই পৰিলো মই গণিতৰ মহাসাগৰত,
বায় যাওঁ ডিঙা সসীমৰ পৰা অসীমলৈ।

~মুকুতা মণি দাস
FYUGP প্রথম ষান্মাসিক

DEPARTMENT OF MATHEMATICS

ARYA VIDYAPEETH COLLEGE (AUTONOMOUS)

Achievements by the students of Department of Mathematics :

Our Glory

Hemanga Jyoti Parashar of B.Sc. Batch 2023 Secured the first class first position in Mathematics under Gauhati University .

Our Pride

Pradakshina Kalita from the Mathematics Department of Arya Vidyapeeth College B.Sc Batch 2024 won the 3rd position in the Self-Composed Poem recitation Competition at the Gauhati University Youth Festival 2024.

She was also honored with the Nilmani Phookan Literary Award in 2024 for her outstanding contributions to literature during the college's Annual Week.

Metal Metamorphosis

Sourav Kalita, a student from UG 5th semester founded a startup of making sculptures from waste metals. He also got 2nd prize in Startup Manthan 3.0 hosted by Cotton University, currently he is backed by OIL INDIA LIMITED in his Startup named
METAL METAMORPHOSIS .

Some of his Sculptures -

Our Cartoonist

-Juman Deka from FYUGP 3rd semester got 2nd prize in cartoon making competition held in Rangia College, Gauhati University zonal youth festival 2024.
-1st prize in drawing on Einstein day 2024.
-3rd in poster making competition in Arya Vidyapeeth college (A).

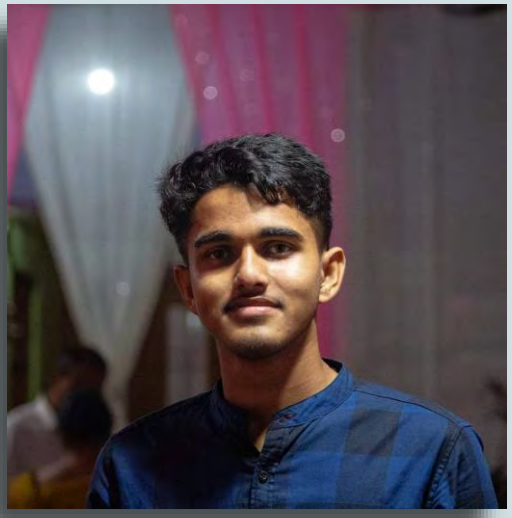
Departmental Wall Magazine “Sutrayan” : 2nd Prize winner in 2024

Girls Cricket team runners up in college week 2024

Quiz Competition winners on the occasion of National Science Day 2024

1st prize
Utpal Kakati
Bitupan Bhargab

2nd Prize
Animesh Deka
Partha Pratim Sarma



Anamitra Khargaria
FYUGP 3rd semester

His Achievements in college week 2024-

Bhupendra Sangeet - 1st Position
Lokogeet - 1st Position
Bongeet - 2nd Position
Rabindra Sangeet - 3rd Position
Modern song - 3rd Position
Parvati Prasad song - 3rd Position

Others :

1. Juri Koch got 3rd prize in Solo Act College Week 2024
2. Rupak Gohain got 1st prize in Chess Competion in College week 2024

Wall Painting competition: 1st prize winner in college week 2024

Members

1.Bidisha Rabha (FYUGP 3rd semester)
2.Utpal Hazarika (M.Sc. 3rd semester)
3.Neha Ahmed (M.Sc. 3rd semester)
4.Krishanu Bormudai (M.Sc. 2024 Batch)

Some prizes in Sports Category –

1. Cricket tournament Runners up
2. Kho-Kho Runners up
3. Tug of war 2nd prize (Girls)
4. Kabbadi 2nd prize (Boys)

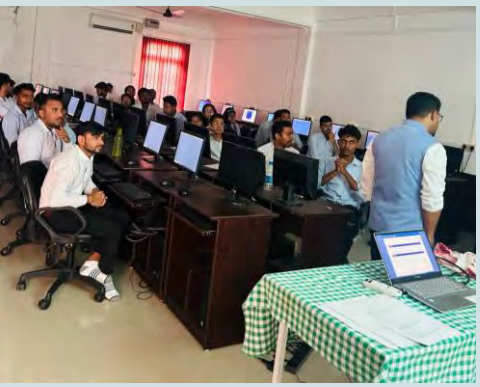
Educational Tour to Tezpur University,Napaam

A meeting with the research scholars of Mathematics Department of Tezpur University

In the Central Library of Tezpur University

Cultural Rally 2024

One day workshop on Algebra
With Dr. Chandra Chutia,
Associate Professor Department of mathematics
Jorhat Institute of Science and Technology

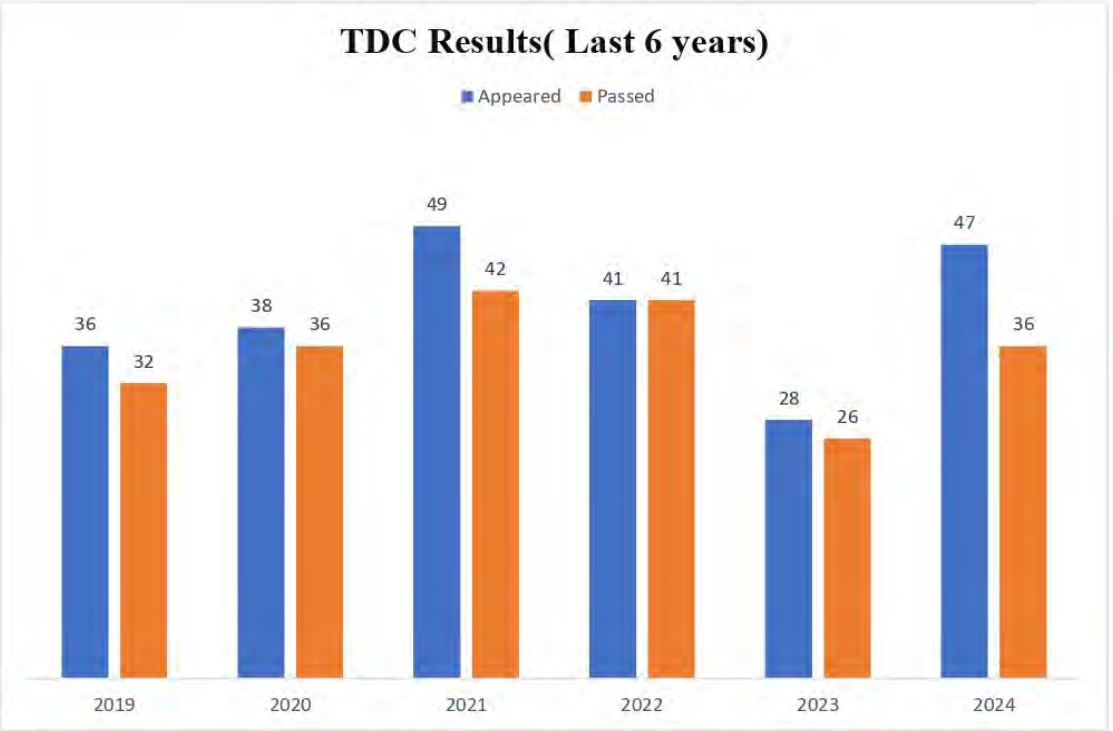


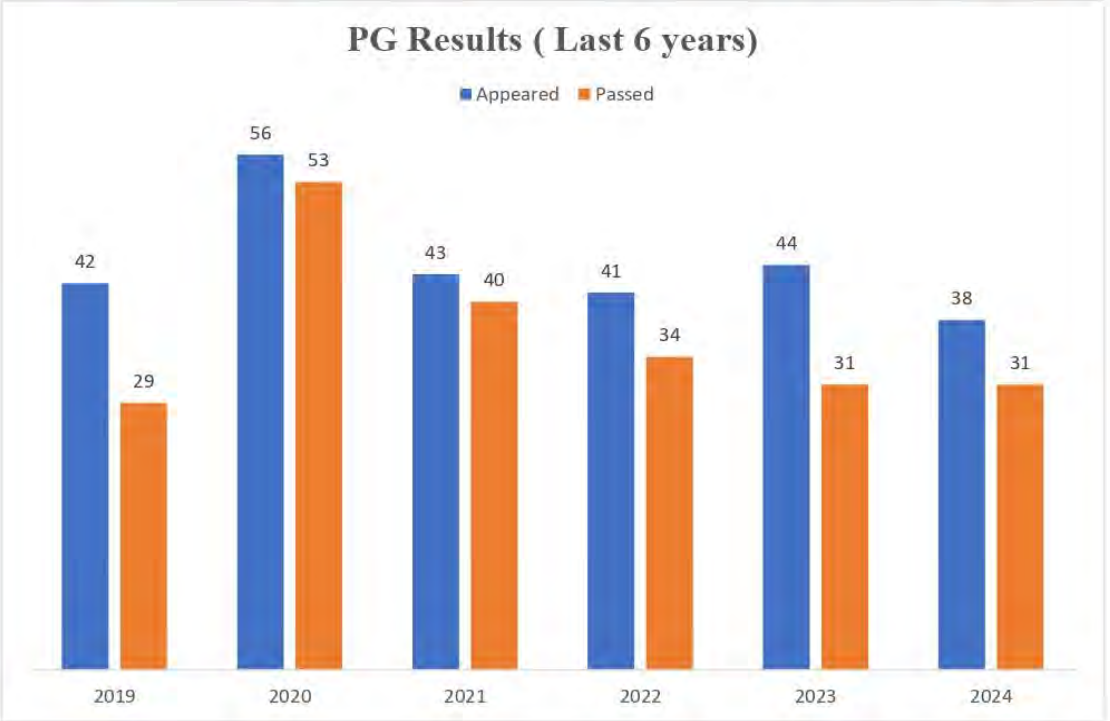
Popular talk on Introduction To “GAP”
and Inter College Mathematics Quiz Competition
Hosted by Dr. Parama Dutta,
Assistant Professor,
Lakhimpur Girls College

Shops organized by the students of Department of Mathematics on World Entrepreneurship day

Educational Tour to NIT Agartala March 2024

Department of Mathematics results





Our Achievers

Biswajit Deka (2014-2017 TDC batch), joined as Assistant Professor, Department of Mathematics, BHB College, Sarupeta, Bajali District.
Date of joining: 19/02/2024

Pratyush Priyam Saikia (2018-2021 TDC Batch), Joined as Assistant Accounts Officer

Surajit Sarkar (2017-2020 TDC batch), Joined as Lecturer, Mathematics, Nowgong Polytechnic, Nagaon.
Date of Joining 09/10/2024

Rishabh Chakraborty,
Cleared NET in June, 2024

Payal Tak,
Cleared SLET in 2024

THANK YOU