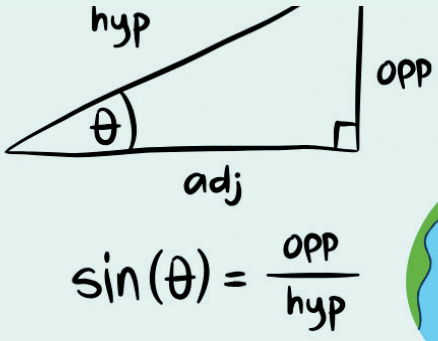
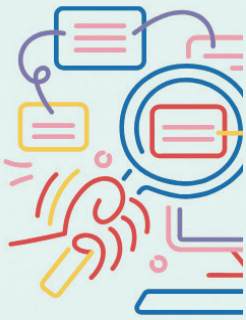
# ST. XAVIER'S INSTITUTE OF EDUCATION (AUTONOMOUS), MUMBAI

**Batch 2021-2023 & 2022-2024**




# MATHEMA



## Gives us hope that every PROBLEM has a SOLUTION

-Alisha Pereira

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# Credits


I/C Principal

Dr. Vini Sebastian

Editor

Alisha Pereira

Math Club members

Patricia Sequeira

Candice Falcao

Selsina Dodti

Allina Pereira

Aditi Corriea

Ayesha Ansari

Alisha Pereira

| | | |
|---|---|---|
| Aarti Singh | Harshali Amle | Reon Vaz |
| Aditi Corriea | Janice Lobo | Rhea Gonsalves |
| Alisha Pereira | Leroy Andrandes | Ritesh Khandelwal |
| Allina Pereira | Livia Pereira | Russell D'Souza |
| Aleena Babu | Lalin Raja | Samantha Vaz |
| Ann Miranda | Mohit Barla | Sanica Coutinho |
| Avilon Gonsalves | Myron Gomes | Dr. Selby Jose |
| Ayesha Ansari | Nevelle Coutinho | Selsina Dodti |
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| Candice Falcao | Nissy Elizabeth Daniel | Sinera Gonsalves |
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# From Principal's desk

## MATHEMA...ENJOY THE JOY OF LEARNING MATHEMATICS

**-Dr. Vini Sebastian, Professor, Pedagogy in charge, Principal-in-charge**

Mathematics Pedagogy group of St. Xavier's Institute of Education (Autonomous), Mumbai has made an attempt to bring the Joy of Learning Mathematics. We believe in the 'MAGIS the greater and more. In our effort to unveil the joy of mathematics learning, we bring to you this newsletter designed and made by the Mathematics Pedagogy students, batch 2022-2024, Semester 2. We have tried to make it multidisciplinary as articles and perspectives have also been presented from across disciplines.

Mathematics Pedagogy group has been organizing 'Mathematics Webinars' in the main theme-Strategies and Solutions in Boosting Mathematics Learning. In the series of webinars, we had, with the videos of the presentations uploaded on YouTube, the Mathematics Pedagogy group has made a significant contribution to the Mathematics group of educators


We have made an attempt to unleash the creative potential of Mathematics. We believe that Mathematics can foster understanding of all other subjects, thus it is the 'Mother of learning Mathematics. 'Mathema' as a newsletter is made with the objective of reaching each Mathematics educator, who is engaged in inculcating the joy of learning Mathematics. The articles, poems, songs, representations shown in this newsletter can be used in class and integrated in Mathematics learning.

Mathema ... is a gift to every teacher, sets out to infuse excitement in every teacher, and hopes that every student can be made to understand the aesthetic dimension of Mathematics along with the normative dimension which most teachers focus on. The world is moving towards multidisciplinary learning, this newsletter has provided ideas for multidisciplinary learning and experiential learning of Mathematics. The newsletter also portrays the soothing side of Mathematics with more of relaxing techniques which can do a lot of good to the affective domain of the students.

et us bring the world of Mathematics to our students in a fun-loving way, decrease the phobia surrounding the subject and make Mathematics more friendly as a subject. Our aim is to see that students develop an inner urge to do Mathematics and they do it willingly and joyfully We hope the newsletter creates a snowballing effect with more such creative activities emerging from those who read it

# Editorial team

We are thrilled to introduce the latest edition of our Mathematics Newsletter, a platform dedicated to unravel the mysteries of numbers, shapes, and mathematical concepts that shape our world. As part of the editorial team, we are excited to embark on this journey with you, delving into the captivating realm of mathematics and its applications in various fields in our day-to-day lives.

In this newsletter, you can expect to find a diverse range of articles, and poetries, from cutting-edge research highlights to engaging yourselves in mysterious puzzles and exploration of mathematical history. Our goal is to make mathematics accessible, engaging, and enjoyable for all readers, regardless of your level of expertise. Whether you are a seasoned mathematician or just starting your journey in this fascinating field, we aim to provide content that will both inform and inspire your thoughts and journey about mathematics. We invite you to embark on this journey with us whether you're a student, teacher, or simply someone who appreciates the elegance of numbers, feel free to join us in celebrating the wonders of mathematics.

We hope this newsletter becomes an asset fostering a deeper appreciation of your thoughts on the beauty and significance of mathematics. Thank you for joining us on this exciting endeavor, and we look forward to sharing the beauty and wonders of mathematics around you.

**-Alisha Pereira**

# History of Mathematics

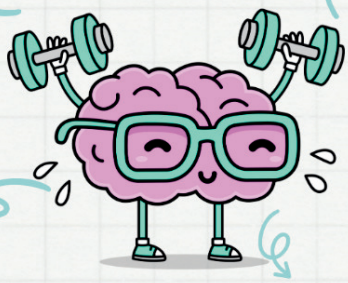
## Mathematics across countries

"Mathematics," which means "knowledge," derived from Greek word "mathema."

- **Indian**
  - Pythagorean theorem, calculate the square root of 2 with numerous decimals, and furnish a compilation of Pythagorean triples.
- **Babylonian**
  - Inhabitants of Mesopotamia (now Iraq) between the Sumerian and Christian eras known as "Babylonian mathematics."
  - Gave the first examples of mathematics in writing
- **Chinese**
  - Introduced **"Rod numerals"**
  - Earliest decimal multiplication table
- **Egyptian**
  - Documented in artifacts like the Rhind (Ahmes) , kills in areas such as prime and composite numbers, arithmetic, geometry, and techniques for multiplication, division, and unit fractions
- **Roman**
  - Added a leap year every other year.
  - Detected financial fraud and administer taxes for the Treasury
- **Greek**
  - Employed rigorous mathematics to prove conclusions, drawing from well-defined axioms and logic.

## Mathematics across centuries

### Maths around the centuries



**17TH CENTURY**

Tycho Brahe meticulously described planetary positions mathematically. aided by logarithms by John Napier and Jost Bürgi. Cartesian graphs

**18TH CENTURY**

Concept of graph theory with the Seven Bridges of Königsberg problem, and popularizing symbols like π and i, topology, graph theory, calculus, combinatorics, and complex analysis.

**19TH CENTURY**

Series, convergence, geometry, complex variables, and proving the quadratic reciprocity law and algebraic fundamental theorem, no parallels and triangle angles sum over 180°

**20TH CENTURY**

Four-color theorem using a computer, independence of the continuum hypothesis from set theory's axioms, Kepler hypothesis in 1998

**21ST CENTURY**

Millennium Prize Problems, Poincaré conjecture , open-access publishing is on the rise

-Aditi Corriea

# Internship experience in giving Mathematics lessons

It is rightly said, **"Experience is the best teacher"**. Right from my school days, I dreamt of being on the other side of the class teaching and expressing my thoughts, and mathematics always fascinated me since childhood. I still remember my school days when I used to pretend to be a teacher with no students, considering the door as my chalkboard, and would end up getting scolded by my mother for using the door as CB.

All the cherished memories, and childhood dreams that I have been dreaming of right from the school days were going to be true soon. My first lecture was on 18th June, 2023 in Mary Immaculate Girls High School, Borivali in class VI. I was excited and motivated about teaching yet the feeling of butterflies in my stomach before the lesson was unforgettable. Seeing those happy little faces gazing at me always enthusiastic to learn, encourages me to be more passionate about teaching. I got rid of all sorts of anxiety and negativity standing right in front of 65 students. I enjoyed teaching and the class response was something that I never thought. I ended up getting completed assignments till August 12, 2023 and that was really surprising. For the remaining 6 lessons I started thinking from the context of the students which made me explore more about the topic. It was an enriching experience where I got to learn new things. There were times were my lessons could not go the way I planned but instead of being demotivated I tried to reflect on the errors and work on the ways in which I could improve my upcoming lessons. Teaching has always been a dream, and this internship period was amazing which gave me a zeal for my passion for teaching. It was not physically teaching mathematics but using all sorts of stories, activities, and innovative methods of teaching to make it engaging and interesting.

**Mathematics** gives hope that every PROBLEM has a SOLUTION, and if students understand the concepts well then they are surely going to stand out in their professional as well as personal life.

**Mathematics is a journey that you need to cherish throughout, but the journey is what matters and not the destination.**

**-Alisha Pereira**

As a B.Ed. student, my internship experience has been a pivotal chapter in my journey towards becoming a skilled educator. The students of St Xavier's College (Autonomous) began their semester II internship from the 17th July 2023 until 15th August 2023. Over the course of 4 weeks, I had the privilege to intern at Dr. Antonio Da Silva High School and Holy Name High School, where I delved into the vibrant world of teaching, learning, and classroom management. We were engrossed with proxies on our first day of internship at Holy Name High School. Walking into my internship, was a blend of excitement and nervousness. The real classroom environment was different from what I had envisioned. In an effort to make math engaging and enjoyable for the students, I used a variety of instructional tools, including teaching aids, charts, and quizzes. There were several give-and-take interactions throughout class exercises. The idea that mathematics might be connected to games, poetry, and everyday life fascinated children. Adapting to the diverse learning styles, abilities, and attitudes of students required me to be flexible in my teaching strategies. 15th August was our last day of internship of semester II with Holy Name school, where we celebrated the 76th Independence Day. Initial hurdles were overcoming the fear of public speaking and creating engaging lesson plans that catered to different learning needs.

# Internship experience in giving Mathematics lessons

Learning the art of classroom management was another crucial aspect of my internship. Throughout my internship, I maintained a reflective journal that documented my daily experiences, challenges, and triumphs. Reflecting on these entries allowed me to recognize my growth as an educator. I became more adaptable, patient, and empathetic. Overall, the school internships enhanced my practical skills, confidence, and readiness for B.Ed. graduates to enter the teaching profession

**-Patricia Sequeira**

There's a famous quote which goes, **"Tell me and I forget. Teach me and I remember. Involve me and I learn."**

School internship is an important part of the two-year B.Ed. program. It is a period of work experience that provides direct learning experience to the student-teachers in various roles of a teacher, including teaching the subject.

The students of St. Xavier's Institute of Education were sent to different schools as a part of their Semester II internship for a period of 3 weeks. It commenced on July 18th, 2022 and continued till August 5th, 2022. I was allotted St. Ignatius High School at Mahalaxmi, which is a government-aided English-medium school. The overall ambience of the school was pleasing and a conducive atmosphere for studying was maintained. The school has good infrastructure and electric facilities, and the classrooms are equipped with smart boards, which help students connect with the world of technology.

A week before the internship commenced, i.e., on July 11th, 2022, we had been to our respective schools to collect the units from our pedagogy teachers. The mathematics teachers at St. Ignatius High School were very cooperative right from the first day, and I got all five units from different teachers on the same day.

During these 3 weeks of internship, I not only gained experience of teaching mathematics to students across various grades but also got to participate in various school activities like the morning assembly, Mass P.T., Swachh Bharat Abhiyaan organised by ICMR, etc. All my shadow teachers allowed me to observe their lessons without being hesitant or reluctant, and the work allotted to me by them helped to hone my skills in classroom management, paper correction, note dictation, conducting revisions, etc. Through the course of this internship, I have gathered various experiences and expanded my knowledge through activities and tasks assigned to me.

The Semester II internship was a period of intense learning and understanding the practical aspect of being a teacher. I'm looking forward to gaining more knowledge, honing my skills as a teacher, and developing myself both personally and professionally during the Semester III internship.

**-Samantha Vaz (Batch 2021-2023)**

**A number that remains the same when its digits are reversed are called palindromic number**

# Internship experience in giving Mathematics lessons

Just like performers such as musicians, dancers, actors, etc. need a stage to display their potential to mesmerize the audience, student-teachers also need a platform to showcase and improve their skills on the road to becoming a full-fledged teacher. During this semester I had an opportunity to work closely with St. Teresa's High School.

"There should be no such thing as boring mathematics."

This was the only quote constantly going on in my mind while preparing for my lessons. Finally, the day arrived. Since it was my first lesson in a real class situation with students from different backgrounds, I was very nervous and tense. The nervousness wasn't due to the stage fear, nor was it because this was going to be my first experience as a student teacher, but it was because I was worried about whether or not I could make the class engaging and will the students enjoy and learn from it. But this nervousness helped me in coming out with unique ideas for conducting my lessons. It's said, "Mathematics is not about numbers, equations, computations, or algorithms: it is about understanding". I was able to make use of a lot of teaching aids, practical demonstrations, and PPTs which were very useful in providing the students with better clarity regarding the concepts. Also, the use of mathematical concepts in real life was something that gave them a lot of excitement regarding the subject. The live demonstrations took the lectures to a different level making the sessions interactive & active base.

After my first lesson, I observed that students were very keen and would eagerly wait for our lessons as we conducted our lessons with a very different approach as compared to regular classroom teaching. I conducted a lot of activities and had wonderful give-and-take sessions with the students. It was an experience worth a lifetime which involved lots of learning and certainly a lot of memories to cherish.

**-Osden Lopes (Batch 2021-2023)**

WOW

## Beauty of Mathematics

$9 \times 9 + 7 = 88$

$98 \times 9 + 6 = 888$

$987 \times 9 + 5 = 8888$

$9876 \times 9 + 4 = 88888$

$98765 \times 9 + 3 = 888888$

$987654 \times 9 + 2 = 8888888$

$9876543 \times 9 + 1 = 88888888$

$98765432 \times 9 + 0 = 888888888$

**-Selsina Dodti**

Must Try

**Although I'm nothing, I play like a pro. You follow me and you're the same, you lead me and you'll grow. Who am I?**

# Internship experience in giving Mathematics lessons

### 1)Will there be a test ?

With a lot of excitement, curiosity, and a bit of nervousness, I entered class VI-2 of St. Xavier's Boys' Academy. With their shining eyes, the young, energetic kids rose to their feet and greeted, "Good Morning, Miss." Oh! Yes! My internship has started.It was time to apply all learned theories in a practical setting. First I introduced myself and then introduced the subject I would be teaching- Mathematics. Then there rose a hand out of nowhere. I hadn't even started the class yet. Anyway, I asked the boy to speak. He asked, "Miss, will there be a test after the class?" I felt it quite funny, but I realised that the entire class turned toward me and was waiting for an answer. I said, "No, there won't be any tests." Ah! The sigh of relief with which the boy fell back on his bench was as if I had removed a yoke from his neck. The entire class was now relaxed and curious to learn. Though only one child got up and asked this question, exams and tests have always been the villains in a student's life. And in the race to score more marks, they are not able to enjoy the learning process. The exam-oriented mindset is instilled in the students consciously or unconsciously by the teachers, administration, parents, and society, which continuously plays in the subconscious minds of the students. Enabling students to learn without the fear of exams is essential.

### 2) What if they don't want to....?

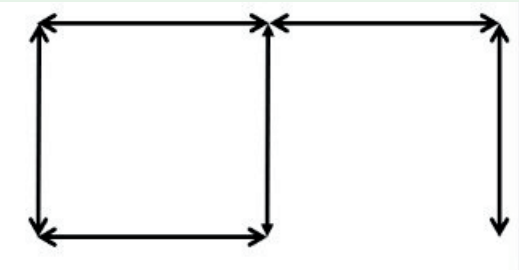
Another day, I was teaching 'Fractions on a Number Line' and I connected it to the timeline of technological advancements in the world. I asked, "Boys, what are the different electronic gadgets that you use daily?" I wanted to inculcate in them a scientific temper, and therefore, we had a small discussion on the merits and demerits of technology and how to make the best use of technology. While discussing the drawbacks, I asked, "Do you spend more time with your family or with your gadgets?" The children gave varieties of answers. Then, out of nowhere, a small voice said, "Miss, what if they (family) don't want to spend time together?" It was a disturbing question. His face clearly showed that he was willing to have a good family time, but for some reason, his parents were not able to do so. I couldn't inquire more, but his class teacher witnessed it as she was observing my class. In this post-modern world, people are always in a race to meet the needs of their families, and in doing so, they are unable to give time to their families, especially to their children. We cannot blame the parent or the child. But we can certainly strive to do our best for our near and dear ones. Both these experiences gave me the crux of a child's life and will never be forgotten.

**-Nissy Elizabeth Daniel (Batch 2021-2023)**

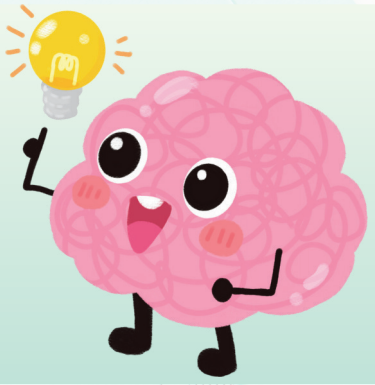
## Brain Teaser

**Instruction-**

**Move 2 lines to form 5 quadrilaterals**



**-Ayesha Ansari**



# Poetry


## Mathematics a path towards infinity

A journey too far to go beyond,
A logical pathway to tread on,
A universe chirping the sweet sound,
Light travels, a passing photon!

Speed measured through space,
Sight of galaxies, gleaming with beauty,
What comparison can you guess,
Wide, wider than infinity!

Mathematics creates a structure,
In a universe with all it' mystery,
What holds for a curious mind,
A path towards infinity!

**-Nevelle Coutinho**

## Symphony of Silliness

Chalo do doston ki baat karte hain
Maths aur Science, inki pehchaan karte hain,
Maths ki puzzles, they're like a mystery's clue,
Science ke experiments, they give us something new.
Geometry ke shapes, they make a funny crew,
Science ke experiments, like a cosmic barbecue.
Statistics ke picnic pe, they make quite a sight,
Maths ka equation, Science ko deti hai flight
Chemistry ke reactions, they create quite a scene,
Maths ke calculation, Science ko lagte hai ek comedy ke dream.
Fluid dynamics ki flow, it's like a river's race,
Maths aur Science, they're in a funny cosmic chase.
Probability ki duniya, it's like a game of dice,
Maths ke formulas, Science ko banate hain extra spice.
Together they rock, like a musical fusion,
Maths aur Science, creating a scientific illusion.
Calculus ke limits, they push the boundaries high,
Maths aur Science, they say, "Let's reach for the sky!"

**-Shruti Shukla**

## My Math Adventure

In math's vast domain, a journey unfolds,
Where stories of learning and passion are told.
Algebra's mystery, once conquered with might,
Scored full marks, yet math stayed out of sight.

Geometry emerged, a new chapter to face,
With angles and shapes, a challenging space.
Though tough it appeared, a struggle was real,
A desire to conquer, a drive to feel.

Yet amid the journey, a glimmer did spark,
Algebra's beauty, a guiding light in the dark.
A favorite emerged, a passion anew,
Practicing persistently, a dream to pursue.

Scores soared again, a victory so sweet,
The path was becoming an incredible feat.
Math's world expanded, a decision was made,
To choose it as a career, a passion well-laid.

Now with a heart full of zeal and delight,
A mission emerges, to kindle the light.
To students, to share the wonders unseen,
And create love for math, like never been.

With patience and stories, connections to show,
Math's magic and charm in full glow.
A journey from reluctance to a mission so grand,
To inspire young minds, across the land.

**- Candice Falcao**

## Facts

$\pi$

**"In the realm of numbers, pi is the poet's muse, inspiring infinite verses that circle the mathematical horizon."**

# Journey with Mathematics

## Mathematics- the constant in my life

Mathematics as a subject has been dreaded by many students. However, in my case, Maths was one of my favourite subjects. The reason was that it didn't require me to rote learn and it was fun to solve the problems. The interesting part of the subject was the construction of geometrical figures. I remember that in school we had special lectures dedicated just to geometry. However, my teachers never used innovative strategies to help us plot the figures more accurately. We were never really taught the underlying logic of the construction, so it was difficult to solve the tricky problems. When it came to algebraic equations, I remember I had many questions related to the derivation of certain formulas. However, the teachers wouldn't really answer my doubts and some even asked me to rote learn the formulae. Nonetheless, there were some teachers in the higher secondary who were passionate about Mathematics, and they tried to teach the difficult topics with much enthusiasm. They even went to the extent of taking extra lectures for students who found the subject difficult.

The current trend of teaching Mathematics is deviant from the traditional methods of teaching. This is because teachers today bring in a variety of learning resources to help students understand the concepts better. The teachers are trained well and when they go into their classrooms, they put in a lot of effort to teach the students the basics of a particular topic. Thus, they make the subject easy and interesting for the students.

**-Janice Lobo**

## My Journey with Mathematics

**My expedition with Mathematics, the number game!**

It was a smooth ride with mathematics, until standard ninth. The 2nd chapter of grade 9 Mathematics part 2, page 19 gave me shivers. The chapter was "Real Numbers" and from there, the confusion, self-doubt, and hatred for mathematics began.

My performance with this particular chapter was terrible. It was around the mid-first term, my Math tutor Sir Worlikar arranged a special revision class for me, where he gave a few sums to solve. After every step I would ask, "Sir, please see if this step is correct?" it was then that he sensed that it was not math, it was my low self-confidence due to which my performance was bad. He taught me mathematics which helped me to develop self-confidence and also to believe in myself.

I was back on track and did well in the finals.

Oh wait, I'm still not in love with mathematics yet. Now, it was because of my 10th grade math teacher Ms. Sharon that my love for mathematics increased. It was everything about how she bought math to us, especially to me. She simplified the concepts and made them interesting. It was nothing short of a story! Not only I just fell in love with the subject but I also topped mathematics in my class. I definitely owe this to my Math tutor and my 10th grade math teacher. Here I am today, a master of mathematics, pursuing B.Ed. And I hope to inspire my students and generations just the way my teachers inspired me and instilled the love for the subject of Math!

**-Rhea Gonsalves**

**Any map can be colored using only four colors in such a way that no two adjacent regions have the same color.**

# Thoughts on Mathematics

**Without mathematics, there's nothing you can do. Everything around you is mathematics. Everything around you is numbers.**

**-Shakuntala Devi**

## Rollercoaster ride with Mathematics

As always, this compendium of published writing covers mathematics, a great deal of ground. There are several people who love mathematics and on the contrary who hate mathematics. It means that mathematics is different for each and every individual to understand and comprehend. The nature of mathematics is optimistic as well as pessimistic. For me, mathematics was an enemy that always won during exams giving me lower marks in it. I always had that melancholic feeling of never succeeding in math, but to my own astonishment, I was surprised to see how excellent marks I scored in my final exams. How did it happen? I wondered. But then I recollected my past and remembered that "never to give up until all the grounds of doubt are cleared". And, as we all know "Rome was not built in a day it took time to become the world's most perfect architectural city. I practiced and never gave up on myself, it also helped in build my self-confidence in other various fields. I enjoyed my journey in mathematics and I hope you must be having one too!

**-Cheryl Rodricks**

## Thoughts on mathematics

I still remember my father telling me to do quick mental math whenever there were to be any calculations done. He is a math enthusiast, and we used to discuss it whenever we came across anything related to math, like puzzles, quizzes, sudoku, etc. He made me understand and see the true beauty of math. Because of him, I am able to see the world through mathematical lenses. Math has built in me a sense of perception that I would not have otherwise. I have always liked math. Whenever others used to grumble about how boring and difficult math is, I would happily solve the problems. I like how when we look at a problem, we don't know what its solution will be, but as we solve each step and get closer to the solution, our curiosity grows, leading us to solve the problem until we get a solution. Every problem gives us some experience. It teaches us to avoid the mistakes we have made previously. I consider that to be the beauty of math.

Learning mathematics might be a good or bad experience. What is the line that draws this difference in experience? According to Britannica.com experience is "the length of time that you have spent doing something". Here the word doing is very important. It is mathematics that will give you a good experience.

**-Neral Carvalho**


## Instruction-

**Move only one stick to form a square**

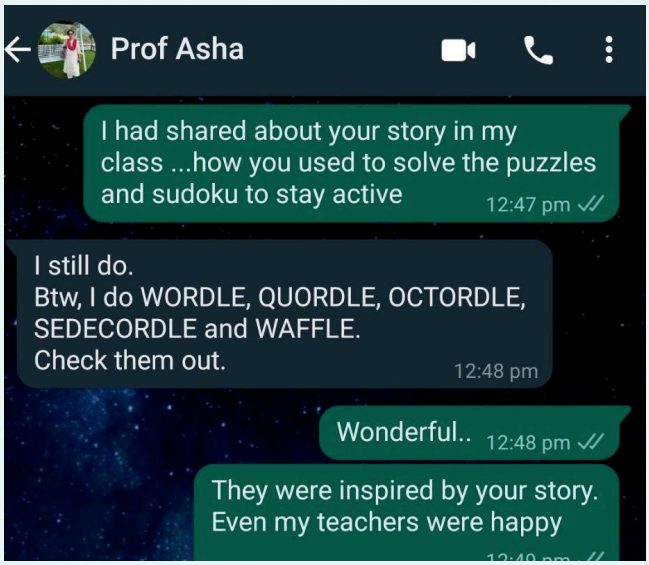
**-Ayesha Ansari**

13

**1) I am an odd number. Take away one letter and I become even. What number am I?**

**2) If 1=3, 2=3, 3=5, 4=4, 5=4 Then, 6 =?**

## FIGHTING ALZHEIMERS




Curious to know her story?

Asha Ma'am is the epitome of hope and inspiration. While earning my bachelor's, she taught me number theory. Her classes are consistently full of fun, jokes, stories, and undoubtedly a healthy dose of fascinating logical number theory. Her aura has the power to uplift low spirits and inject them with passion and energy. Remembering the questions, solutions, formulas, steps, etc. was effortless for her, but the only thing she forgets was her pen or the book.

She was diagnosed with brain cancer a few years ago and, luckily, it was diagnosed and treated at the initial stage. The physicians warned her that if she doesn't keep her mind active, she might develop Alzheimer's. So to keep herself active, she used to tackle logical puzzles, math problems, and mental calculations. She was the first person to arrive each day at the college library, where she would grab the newspapers and solve Sudoku and other puzzles. The remainder of her time was spent teaching and working through math problems with her students.

Her story serves as a reminder that if we preserve our optimism and faith, a bright future is always in store for us. I am one of the many young people she has influenced. She is now enjoying a wonderful retirement with her family, but her love for math and her students has never diminished.

**-Nissy Elizabeth Daniel**

### Tuition for mathematics

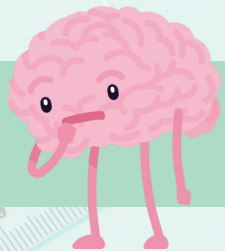
The study of mathematics, like the Nile, begins in minuteness but ends in magnificence." – Charles Caleb Colton

Every school tries to cater to every student's educational needs, but there is a limit to how much a school can do. Two major hurdles that each school faces (especially in India) are: a high student-teacher ratio and limited time to complete the syllabus. To tackle these problems, tuition is needed. And when it comes to subjects like math, the difficulty level of completing the syllabus within the given time increases exponentially. Each student has their own pace of learning things, and it is more true when it comes to understanding the concepts of math. For some students, "math class is like watching a foreign movie without subtitles".

At least such students must pay for math tuition. At tuition, they will get more personal attention. They will be able to understand and learn the concepts in detail and can clarify all their doubts. One of the important factors in selecting appropriate tuition is that the tuition tr must be specialised in math and must have the skills to teach the subject in a more interesting and fun-loving way. This will enhance their problem-solving skills and finally allow them to enjoy the true essence of math, resulting in optimum performance.

**-Lalin Raja**

**3) It starts with G and ends with H and shows mathematical data. What is it?**



## Tuition for mathematics

As Shakuntala Devi rightly said, "Without mathematics, there is nothing you can do. Everything around you is mathematics. Everything around you is numbers." Every individual ought to have the basic knowledge and understanding of certain mathematical concepts such as time, money, and quantity to carry out one's daily tasks effectively and efficiently. There has always been a common misconception among people that mathematics is a dry, dull, boring and difficult subject. As a result, only students with a certain IQ can do math, and thus tuitions are required, especially when it comes to scoring well in mathematics. But in my opinion, this need not always be true. If school teachers make an effort to make mathematics learning fun and interesting, students will not have to spend hours sitting for tuition and doing the same things over and over again. Students can practise the sums taught in school on their own and ask the teacher if they have any doubts while solving them independently. However, we cannot ignore the fact that in a classroom we find all types of students. While most of them belong to the average category, there are a few who are slow learners while some who are gifted learners. It becomes very difficult for a school teacher to cater to the individual differences of students within a stipulated time when completing the syllabus is already a major challenge. In such cases, students might go to tuition, where they can be treated as individuals and taught at their own pace without forcing them to exert themselves.

Ones who are slow can be taught the basics of mathematics to build a strong foundation, while gifted learners can be encouraged to solve difficult problems, thus helping them to think critically and analytically. Although one may perform well in mathematics without taking any tuition, tuition plays an important role in increasing one's interest and honing one's skills in problem solving because of regular practice. After all, it's practise that makes man perfect!

**-Samantha Vaz**


**-Myron Gomes**

## Facts

01 **Forty is the only number that is spelt with letters arranged in alphabetical order.**

02 **One is the only number that is spelt with letters arranged in descending order.**

03 **The hour and minute hand of a clock coincide 22 times in a day.**


## Beauty of Mathematics

$1 \times 1 = 11$

$11 \times 11 = 121$

$111 \times 111 = 12321$

$1111 \times 1111 = 1234321$

$11111 \times 11111 = 123454321$

$111111 \times 111111 = 12345654321$

$1111111 \times 1111111 = 1234567654321$

**-Selsina Dodti**

# Mathematics in various field

## Statistics: The favourite child of Mathematics

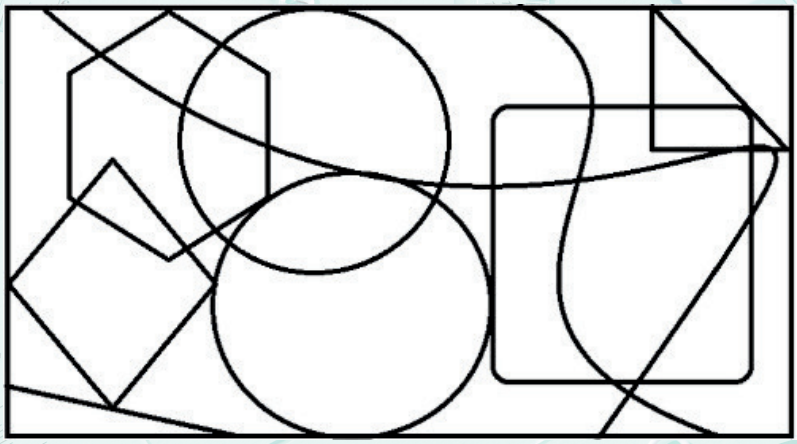
Mathematics and Statistics share some inseparable relations, though both are two different disciplines. Mathematics is very hard to be defined in a single definition. As the renowned mathematician G.H. Hardy once said, “A mathematician, like a painter or a poet, is a maker of patterns. If his patterns are more permanent than theirs, it is because they are made with ideas”. Statistics is a part of applied Mathematics and therefore Statistics is overlapping with Mathematics in the application level. The Mathematical theories behind Statistics rely heavily on differential and integral calculus, linear algebra, and probability theory. Many techniques used in pure Mathematics like integration and differentiation can be used with calculations such as finding the cumulative probability from the probability distribution function and vice versa. In Mathematics the goal is to prove theorems. In Statistics the main goal is to develop good methods for understanding data and making decisions. Statisticians often use Mathematical theorems to justify their methods.

In conclusion, Statistics like most fields of Mathematics: very rigorous and useful in its own right and can be combined beautifully with many other fields to get wonderful result. There are many benefits to studying Mathematics and Statistics together. By studying both subjects, students can develop a strong foundation in both fields. This can be helpful for students who are interested in pursuing careers in STEM fields, such as engineering, data science, and finance. In addition, studying Mathematics and Statistics together can help students develop critical thinking skills, problem-solving skills, and data analysis skills. These skills are essential for success in today's world, regardless of the career path that students choose.

**-Livia Pereira**

BE CREATIVE

## ChromaQuest



**"Mathematics is the canvas upon which statistics paints the intricate masterpiece of understanding in the vibrant colors of data."**

**Complete the coloring of this geometric art so that no two adjacent regions are the same color. You can only use four colors: Blue, Green, Red, and Purple.**

**-Ayesha Ansari**

**"Mathematics is the alphabet with which God has written the universe, and music is the language through which we interpret it."**
**- Galileo Galilei**

## Mathematical Insights into Geography

"Learn how to see. Realize that everything connects to everything else." – Leonardo da Vinci

A profound connection is seen between Mathematics and Geography, where the threads of these subjects come together to weave a tapestry of understanding. Geography as a subject is divided into different branches and many areas from these branches have a strong foundation in Mathematics.

Geographical concepts like cartography and map scale use concepts such as geometry and trigonometry. Math plays a central role in concepts like Parallels of Latitude and Meridians of Longitude as these topics are expressed in degrees. From depth of the oceans to height of the mountains, easy and effective correlation is seen. The concept of Graticule involves elements like co-ordinate systems, angular distance and calculations related to earth's spherical surface, therefore draws a lot from mathematical components. Geography and Mathematics gets closely linked when it comes to navigation, population distribution and land use.

Therefore, it is right to say that Mathematics and Geography intersect to blur the boundaries between subjects and make knowledge a web of connections between different subjects.

**-Sinera Gonsalves**

## "Harmonious Mathematics: Exploring the Mathematical Correlation in Music"

Mathematics and music share a deep and intricate connection, rooted in the fundamental principles that underlie both disciplines. This correlation can be explained through various aspects, such as rhythm, harmony, and structure.

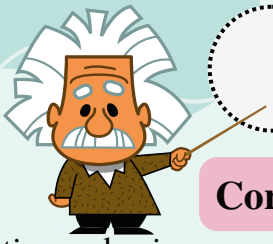
Firstly, rhythm, the fundamental element of music, is inherently mathematical. Musical rhythms are often expressed as fractions or ratios, such as whole notes, half notes, and quarter notes. These divisions of time are analogous to mathematical concepts like fractions and proportions. Musicians use mathematical patterns to create complex rhythms and time signatures, giving rise to intricate and compelling compositions.

Secondly, harmony, the combination of different musical notes played or sung simultaneously, also has a mathematical basis. The relationships between musical intervals, like octaves, fifths, and thirds, can be expressed as mathematical ratios. For example, an octave represents a 2:1 frequency ratio, while a perfect fifth corresponds to a 3:2 ratio. These ratios govern the consonance and dissonance of musical chords, providing a mathematical framework for understanding harmony.

Additionally, modern music production relies heavily on digital technology, where mathematical algorithms are used for synthesizing sounds, creating digital effects, and even composing music through algorithms. This fusion of mathematics and music has led to the emergence of electronic and algorithmic music genres.

Thus, the correlation between mathematics and music is evident in rhythm, harmony, and composition. Mathematics provides the theoretical foundation for understanding and creating music, while music offers a creative outlet for exploring mathematical concepts. This interconnectedness enriches both fields, highlighting the beauty of the relationship between art and science.

**-Benedict Cerejo**



What do mathematics teachers like to eat?

## Correlation of Mathematics with Science.

Mathematics and science go hand in hand in school. Mathematics is like the building blocks for science. Things like algebra, calculus, and statistics are super important for scientists to figure stuff out, like studying data and making predictions.

Both math and science teach an individual how to solve problems. In Mathematics, we learn how to tackle tricky problems step by step, which is useful in science when we make guesses and test them.

Mathematics also helps us talk about numbers in science. Scientists use mathematics to describe how things work in nature, which lets them measure and predict stuff accurately.

When an individual does experiments, they often use mathematics to understand what the data means. If you're good at mathematics, you can plan better experiments and understand the results. Subjects like physics, chemistry, and engineering rely a lot on mathematics. So, when you dive into these areas, you'll see how closely mathematics and science work together. Mathematics and science also make us better at thinking. We learn how to see patterns, analyze stuff, and make logical decisions, which are super useful in science.

In today's world, tech and mathematics are best friends. If you know mathematics, you can use science tools and computer programs like an expert.

Lots of cool jobs in STEM fields need one to be good at both mathematics and science. Mixing mathematics and science in school helps us understand the world better. Like when one learns about how things move in physics, you can also learn about mathematics stuff like vectors and calculus to really get it.Remember, Mathematics and science aren't just for school. They're everywhere in real life, and knowing this link helps us see why they're important.

**-Vedika Pandya**

## The Essential Link Between Mathematics and IT

Mathematics and Information Technology (IT) are deeply connected. The quick responses of our computers and the safety of our online banking? That's mathematics working in the background with IT. Going back in time, great minds like Alan Turing used mathematics to pioneer early computing. And as computers evolved, so did the role of math in shaping them. At the core of our search engines are algorithms. These are sets of mathematical instructions that quickly analyze vast amounts of data to find relevant information. Every online transaction or message you send is protected by cryptography. This method uses mathematical processes to encrypt information, ensuring its safety. All secure online activities rely on these mathematical principles.

In the contemporary era, there is an increasing amount of data being produced. Regarding video games and animations, their realism can be attributed to vector mathematics. Graphics, especially in 3D settings, depend on mathematical concepts to create and display visual elements. The fields of Artificial Intelligence (AI) and Machine Learning (ML) are heavily influenced by mathematics. Foundational areas like linear algebra and calculus are central to their operations, enabling these systems to learn from data and predict outcomes. For anyone diving into IT, understanding math is crucial. It enhances problem-solving skills and fosters innovation. As technology leaps forward with things like predictive analytics, mathematics remains the guiding force.

In conclusion, math and IT are inseparable. Every tech advancement has math to thank. So, as we marvel at tech innovations, let's think about this: What will the combination of math and IT bring us next?

**-Reon Vaz**

**Even though you take any shape with the same perimeter, a circle possesses the largest area.**

## "Mathematics at the Heart of India's Fight Against the Harshad Mehta Scam"

Once upon a time, in the bustling financial hub of Mumbai, India, a storm was brewing in 1992. The nation was on the brink of a major economic crisis, triggered by none other than the infamous Harshad Mehta scam. This is the story of how mathematics emerged as a silent hero during these turbulent times.

In the heart of Mumbai's financial district, whispers of irregularities began to circulate. The clever stockbroker Harshad Mehta had planned out a historic scam by manipulating the stock market and siphoning off vast sums of money from our very own State Bank of India. As the scam was publicly revealed, India's financial hub dived deep into chaos.

Amidst the turmoil, India turned to mathematics as a crisis decoder. Mathematicians, statisticians, and economists gathered to decode this intricate scam. They collected huge amounts of data and employed statistical analysis thereafter to make sense of the extent of financial losses faced by the country.

India's economic policymakers faced a serious challenge. They needed to stabilize the situation and prevent future crises. Turning towards mathematical concepts and economic theories, they formulated policies that aimed at restoring investor's confidence. The equations on their whiteboards then became blueprints for recovery.

The regulatory bodies watching over financial markets underwent a transformation. With the support of mathematical models, they improved market surveillance and introduced risk management mechanisms. Restoring investor trust was of utmost priority hence the nation embarked on a mission to rebuild confidence in the financial sector. Mathematical transparency measures played a crucial role, revealing the path to recovery through reliable data, clear financial reporting, and risk mitigation.

In the end, the story of India's battle with the Harshad Mehta scam became a testament to the power of mathematics in times of crisis. It was a story of resilience, where numbers, equations, and economic theories guided a nation through strong waters. As the storm subsided, India emerged stronger, wiser, and more prepared for future challenges, thanks to the quiet heroism of mathematics in the face of adversity.

**-Noretha Chettiar**

## Slice wise 12-piece challenge

### Instruction-

**USE four CUTS AND GET 12 PIECES**

**-Ayesha Ansari**

01 **Which number is a 'magic number'?**

02 **Initial name for Zero?**

03 **Using only an addition, how do you add eight 8's and get the number 1000?**

**"In the dance of supply and demand, mathematics is the choreographer that keeps the economic ballet in harmony."**

## Relationship between English and Mathematics

English and mathematics may seem like polar opposites in the world of education, but they share a fascinating relationship. On one hand, English and mathematics have fundamental differences in their nature and application. English is a language filled with creativity, nuance, and fluidity, making it the realm of expression, storytelling, and imagination. Mathematics, on the other hand, is a discipline of precision, logic, and rules, focusing on solving problems through structured algorithms and formulas. However, the intersection of these two subjects can be remarkably engaging and they have a closer relationship than you might think.

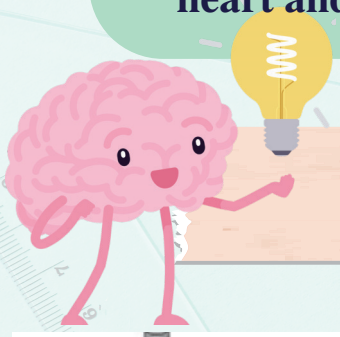
First, both English and math use symbols and rules to communicate ideas. In English, we use letters to form words and sentences, while in math, we use numbers and symbols to represent quantities and relationships. Second, clear communication is essential in both subjects. In English, we need to write and speak clearly to convey our thoughts effectively. In math, precision and clarity are crucial to solving problems correctly.

Furthermore, both disciplines require critical thinking and problem-solving skills. In English, analyzing literature or constructing persuasive arguments demands logical reasoning. Similarly, mathematics is built upon logical foundations, requiring creative problem-solving techniques.

In conclusion, English and mathematics are not isolated subjects but rather complementary. Together, they empower individuals to think critically, communicate effectively, and tackle complex challenges in our ever-evolving world. Embracing the relationship between these two domains can lead to a more holistic and enriching educational experience. **-Ann Miranda**

**"English is the bridge that translates the elegant equations of mathematics into the language of the heart and mind."**

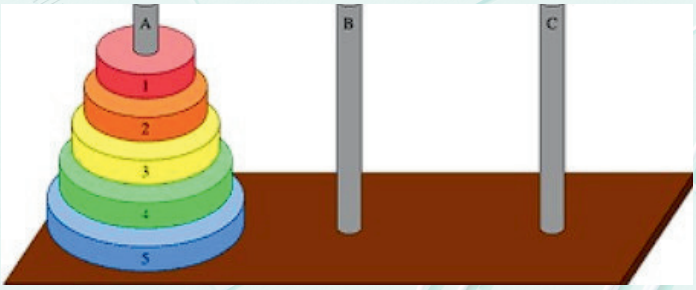
**"Life's challenges are like unsolved equations. Each one holds the potential for growth, and persistence is the key to finding the solution."**



## Disc shuffle challenge

**Instruction-**

**Move all the disc from rod A to rod C in minimum 31 moves**




**Rules**

1.Only one disk can be moved at a time.

2. A larger disk may not be placed on top of a smaller disk.

3.Each move consists of taking the upper disk from one of the rod and placing it on top of another rod

## Does the Merchant Navy include any Mathematics ?

Numerous aspects of ship navigation and operation require mathematics: Navigation: Calculating a ship's position, heading, distances, and bearings requires mathematics, which is supported by tools like charts, compasses, and GPS systems. As well in Weather forecasting: Ships can plan safe routes by using mathematical models to predict weather conditions such as wind patterns, currents, tides, and storms. In Stability and Buoyancy: Mathematical calculations that take into account elements like displacement, buoyant forces, and center of gravity guarantee a ship's stability and buoyancy. For Planning the cargo load makes it easier to distribute weight, make the most of available space, and keep the ship balanced. In Fuel and Speed Optimisation: Mathematical calculations help determine fuel usage, travel time, and environmental impact. As well in Ship Building and Design: To ensure structural integrity and performance, architects and engineers design ship components using mathematical principles. In conclusion, mathematics is essential for safe and effective maritime operations, from ship design and cargo management to navigation and weather forecasting.

**-By The Third Officer in Command of Merchant Navy Sumit Elias D'silva**

## The Essential Ingredient

Cooking is often considered an art, but behind every delectable dish lies the science of mathematics. From measuring ingredients to adjusting cooking times, mathematics plays a vital role in ensuring culinary success. It influences everything from recipe creation to the perfect presentation on your plate, thus mathematics plays such an important role in the culinary world.

Precision in Measurements is one of the most apparent ways mathematics is used in cooking through precise measurements. Accurate measurements of ingredients are crucial to achieving the desired taste and texture in a dish. Whether it's measuring flour for a cake, weighing out spices for a curry, or ensuring the right balance of ingredients in a marinade, mathematics ensures that the chemistry of cooking works harmoniously. Cooking is often about finding the right balance of flavors, and this is where mathematical concepts like proportions and ratios come into play. When you're cooking for a crowd or simply adjusting a recipe to suit your needs, mathematics becomes your best friend. Scaling a recipe up or down requires careful calculations to maintain ingredient proportions, cooking times, and serving sizes. Without mathematics, you risk ending up with an unpalatable mess or insufficient portions. Chefs use mathematical principles to arrange food on a plate in visually appealing ways, considering symmetry, balance, and proportions. A beautifully presented dish can enhance the overall dining experience. In the kitchen, unexpected challenges can arise. Whether it's rescuing a sauce that's too salty, adjusting a recipe on the fly, or converting between measurement systems, mathematical problem-solving skills are invaluable for a cook's success.

In the world of cooking, mathematics is more than just a tool—it's a fundamental ingredient for culinary excellence. So, the next time you embark on a culinary adventure, remember that behind every mouthwatering meal is a touch of mathematics that helps make it extraordinary.

**- Swanish John D'cunha**

**"Cooking is where mathematics meets the senses, transforming numbers into flavors and aromas."**

**A circle has the shortest perimeter compared to any shape similar to it.**

**"Mathematics and history are like the two wings of a bird; only when they work together can we soar to new heights of understanding."**

**-Anonymous**

## Equations to Edifices

The relationship between mathematics and architecture is a symbiotic one. Mathematics provides architects with the tools they need to design and build safe, functional, and beautiful buildings. And architecture inspires mathematicians to develop new mathematical concepts and theories.

The golden ratio is a mathematical constant that has been used by architects for centuries to create harmonious and balanced proportions. This can be seen in many famous buildings, such as the Parthenon in Greece and the Taj Mahal in India.

One of the most important ways in which mathematics is used in architecture is to ensure the structural integrity of buildings. Architects use geometry, trigonometry, and calculus to calculate the forces that will be exerted on a building and to design accordingly. This ensures that buildings are strong enough to withstand the weight of their own structure, as well as the forces of wind, rain, and earthquakes.In addition to the above, mathematics also plays an important role in the following aspects of architecture : to estimate the cost of building a project ,to schedule the construction of a project and to assess the environmental impact of a project towards sustainability.

Mathematics and architecture have a long and intricate history, a relationship that has evolved over time and is likely to continue to do so in the future.

**-Avilon Gonsalves**

## Historical Equations

On the educational spectrum, HISTORY and MATHEMATICS are two subjects that are polar opposites. However, an integration of both the subjects may offer a richer understanding of various concepts.

The history of mathematics is one area that will interest children to develop their interest in mathematics as teachers can connect the origin and evolution of mathematics to the stories of various mathematicians, different cultures, civilizations, names and faces. As the students integrate the two disciplines, they are able to learn Math in an interesting manner integrated with stories.

Mathematics is instrumental in helping historians to analyze the large sets of historical data. By mathematically analyzing large historical data sets, it becomes possible to integrate the two disciplines, conducting deep source analysis systematically while covering long spatial and temporal distances. Historians can also use mathematical tools to analyze demographic data, economic trends, and social patterns. For example, statistical techniques can reveal the impact of historical events on population growth, migration patterns, or economic disparities. Although this fact just touches the surface of how mathematics can be integrated into history in an effective manner.

One of the most popular examples to connect history to mathematics is in the Harappan Civilization. It was called a modern civilization due the meticulous planning and mathematical principles applied for Harappan town planning (grid like street pattern, symmetry and accuracy in buildings, mathematically calculated slopes and flow rates for drainage system).

Therefore, it is evident that Mathematics and History are not isolated disciplines, but highly connected and with a vast scope for integration. This integration may also be successful in helping students overcome 'Math Phobia.'

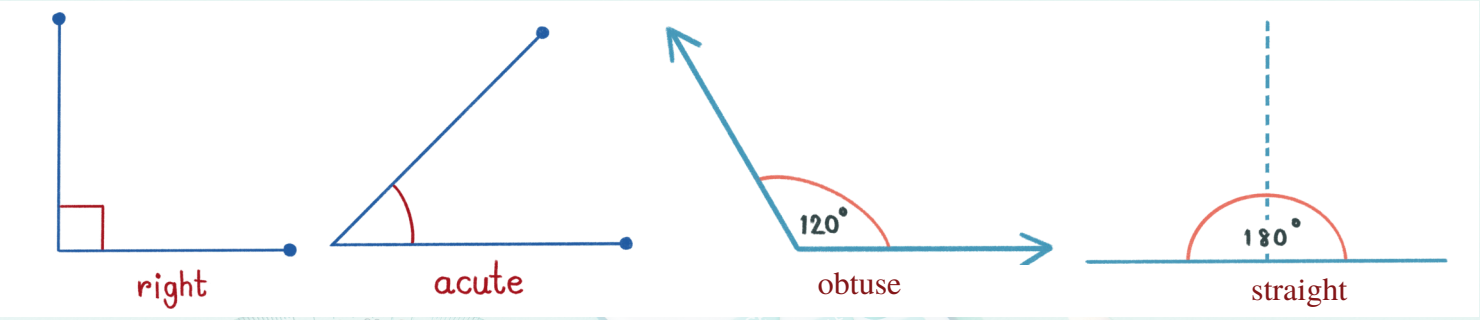
**-Aleena Babu**

## Embracing Life's Angles

Once upon a time in the village of Geometria, there lived two good friends, Emma and Liam. They were known for their curiosity and enthusiasm to explore and learn new things. One sunny day, while exploring the forest near their village, they stumbled upon an old, wise owl named Professor Anglewing.

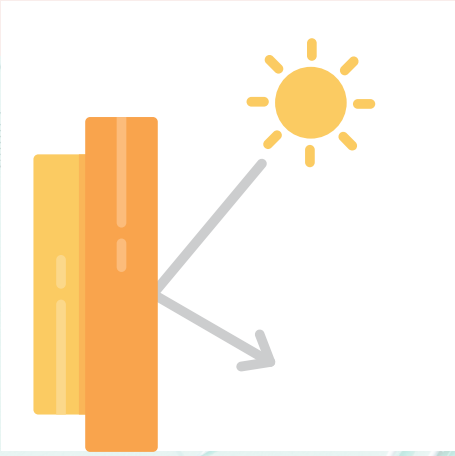
The owl noticed their curiosity and edge to learn new things and decided to teach them a valuable lesson about Angles. He explained that angles were like the corners of life, and each angle had its own significance and purpose.

He showed them how a **right angle** symbolized balance and harmony, much like the friendships they shared. An **acute angle**, on the other hand, represented their eagerness to embrace new challenges and learn from them, while an **obtuse angle** taught them about flexibility and adaptation. **Straight angle** represent open-mindedness and acceptance.




The owl then took them to a beautiful clearing where sunlight streamed through the leaves in the forest. He explained that just as light could change its direction when it encountered an obstacle, so could their paths in life. Sometimes, unexpected changes lead to the most beautiful outcomes, much like how light creates mesmerizing patterns when passing through various angles.

As the sun began to set, the owl concluded, "Remember, dear Emma and Liam, life is full of angles – some easy, some challenging, but all contributing to the beauty of your journey. Embrace each angle with an open heart, just as you embrace the different facets of life."

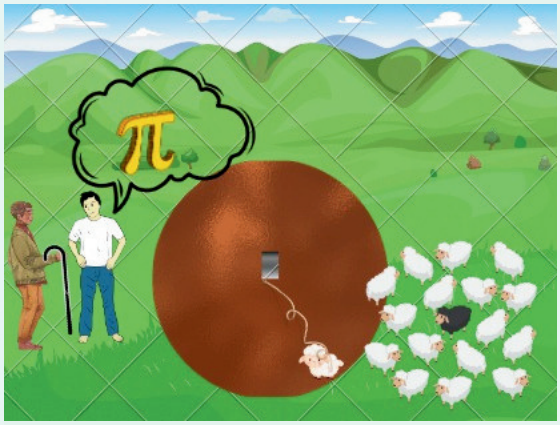


And so, Emma and Liam not only learned about angles that day but also imbibed a valuable moral: **to approach life's twists and turns with curiosity, adaptability, and an open heart, for each angle holds its unique beauty and purpose of existence.**

**-Alisha Pereira**

# The Curious Quest for Circumference

In the village of Curvica, where hills rolled and rivers wound, lived a young shepherd named Leo. One day, while watching over his flock, Leo noticed the circular patterns formed by the grazing sheep. Intrigued, he set out on a quest to understand the magic behind those perfect circles.




Guided by his curiosity, Leo sought out the village's wise mathematician, Professor Curio. With a twinkle in his eye, Professor Curio explained the concept of "circumference" as the distance around a circle. He also introduced Leo to a magical number called "pi," which was a mysterious key to solving circle-related mysteries.Eager to learn, Leo began his adventure. He rolled his shepherd's staff along the circular path the sheep had created. To his amazement, the distance the staff covered matched the circle's edge. Leo couldn't help but smile at the newfound knowledge.

Leo began his adventure he rolled his Shepherd's staff along the circular path the sheep had created grazing.To his amazement the distance the staff covered matched the circle's edge .Then he saw a string tied to a wheel, he took that string and placed it around the wheel's border. The measure of the string was the same as the circular edge around the wheel . He realised that he had just measured the circumference of the wheel .

Leo's excitement grew as he shared his discovery with his fellow villagers. They gathered at the village square, where Leo demonstrated how to measure the circumference of different circular objects, from wagon wheels to their favourite pies.

The village buzzed with curiosity as everyone took part in the "Circumference Challenge." Each person grabbed a piece of string and measured the circumference of their chosen object. Laughter filled the air as they realised that the **ratio** of the circumference to the diameter was always close to the magical number, pi.

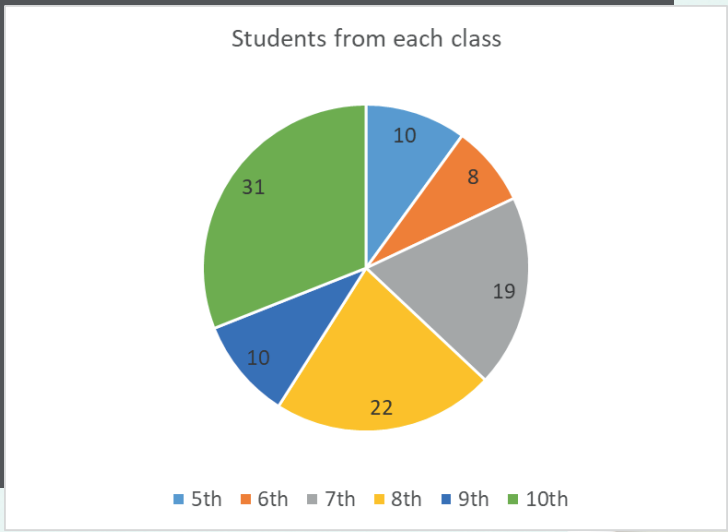
**Moral:-**

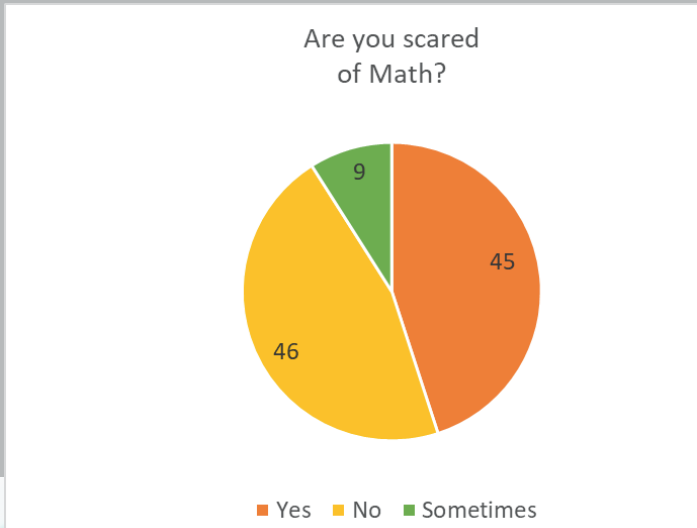
The Curious Quest for Circumference" teaches us that being curious and exploring the world around us helps us to discover new things. In this story, Leo learns about the concept of circumference through everyday observations and simple experiments, which shows that it is good to be curious and learn by doing. This reminds us that even the most difficult ideas can be understood by exploring and having fun.

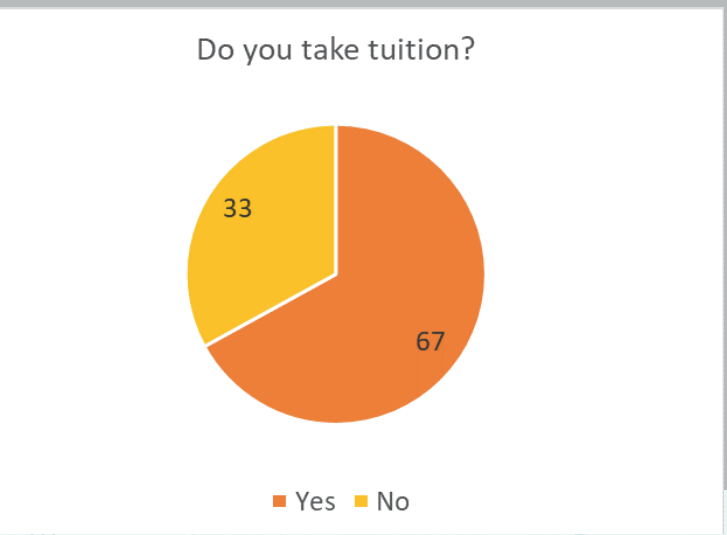
**-Candice Faclcao, Patricia Sequeria, Selsina Dodti, Allina Pereira**

# Survey Findings (Batch 2021-2023)

The internship was indeed a great time of teaching and learning. The Math pedagogy club members were sent to six different schools in Mumbai. To make our internship more meaningful and relevant, our teacher, Dr. Vini Sebastian, gave us the task of conducting a small survey in our respective schools. The main aim of the survey was to identify the different challenges faced by school students in math. Five questions were asked of the students. A total of 100 students, from grades 5 to 10, participated in the survey, and the results were later compiled.




Out of 100 children, 54 admitted to being afraid of math. When asked why, the kids responded with statements like "Math is perplexing," "It's hard to understand the concept," "It's hard to operate," etc.

Which topics are you scared of ? They gave the following answers:
Multiplication, Division, Word problems, Fractions, Quadratic equations, Construction, HCF, LCM, Trigonometry, Similarity, Algebra, Geometry, etc.

It was surprising to know that 67 students take tuition, and many of them still find it difficult. They were also asked to think and speak of a step that they would take in order to perform better in math, to which they answered that they would practice the sums daily, ask the teachers for help, understand the basic concepts, and work hard. “Do not worry about your difficulties in Mathematics. I can assure you mine are still greater.”
**Albert Einstein**

**Compiled By- Nissy Elizabeth Daniel**
**Survey conducted by-Samantha Vaz, Rhea Gonsalves, Sanica Coutinho, Neral Carval, Nissy Daniel, Aarti Singh, Osden Lopes, Lalin Raja**

# VISIT TO HBCSE (Batch 2021-2023)


**Celebrating the art of problem-solving and the joy of mathematical discovery."**

On September 22nd, the Math Club of St. Xavier's Institute of Education, under the guidance of Dr. Vini Sebastain, visited the Homi Bhabha Centre for Science Education. The main agenda of the visit was to have a hands-on experience in the Math Lab and Integrated Lab of the HBCSE.

In the Math Lab, we performed various activities, such as :

Tower of Hanoi- https://youtu.be/pugseXz0gEk

Missing Area- https://youtube.com/shorts/jKk-we6pF-w?feature=share

Magic numbers- http://norsemathology.org/wiki/index.php?title=Binary_Cards

In the Integrated Lab, the students were introduced to a variety of science and math activities integrated together.

**Details of the place:**

Homi Bhabha Centre for Science Education
Tata Institute of Fundamental Research
V. N. Purav Marg, Mankhurd
Mumbai, 400088 INDIA
http://www.hbcse.tifr.res.in

It is a National Centre of the Tata Institute of Fundamental Research (TIFR), Mumbai. The Centre's principal objectives are to spread scientific literacy across the nation and to promote equity and excellence in Science and Math instruction from pre-kindergarten through post-secondary institutions.

**-Nissy Elizabeth Daniel**

# "Mathematics Webinar"

**CONDUCTED BY**
**PROF. DR. VINI SEBASTIAN**
**MATHEMATICS PEDAGOGY**

**COORDINATED BY THE STUDENTS OF ST. XAVIER'S INSTITUTE OF EDUCATION, MATHEMATICS PEDAGOGY**

MATHEMATICS WEBINARS

Mathematics Webinars conducted on the last Saturdays of every month from 2020-2021. The following are the list of topics covered.

| Date | Topic | Name of the resource person |
|---|---|---|
| **Our theme: STRATEGIES AND SOLUTIONS FOR BOOSTING MATHEMATICS LEARNING** | | |
| 29th June, 2020 | Augmenting student engagement of Elementary and children with special needs in Mathematics | Ms. Zara Parekh, Homeroom teacher for Differently abled, Gateway school |
| 30th June, 2020 | Quality Improvement in Mathematics Teaching | Prof. Inder Rana, Dept. of Mathematics, IIT Bombay |
| 25th July , 2020 | Constructivist Teaching : Listening to Students Thinking | Dr. K.S. Subramaniam, Director, HBCSE-TIFR |

| | | |
|---|---|---|
| 25th July, 2020 | HBCSE Enrichment activities for Professional Development | Dr. Shweta Naik, HBCSE-TIFR |
| 29th August, 2020 | Scaffolded Problem based Learning strategy | Dr.Vaishali Sawant, Hansraj, Jivandas College of Education |
| 26th September, 2020 | Aspects of Effective Math Education | Ms. Bhoomi Parekh, Chaturbhuj Narsee School, Mumbai |
| 26th September, 2020 | Pedagogical Content Knowledge | Dr. Narendra Deshmukh, HBCSE-TIFR, Science Department |
| 31st October, 2020 | Discovering Aesthetics in Mathematics | Dr. Veena Deshmukh, Chairperson , SNDT WDU |
| 28th November, 2020 | Ethnomathematics | Dr. Jayshree Subrmaniam, |
| 23rd January, 2021 | Teaching Mathematics with Multidisciplinary Perspective | Dr. Haneet Gandhi, Central Institute of Education, Delhi |
| 27th February, 2021 | Technology enabled Mathematical Explorations: A Catalyst for developing Mathematical thinking | Dr. Jonaki Ghosh, Faculty Dept of Elementary Education, Lady Sri Ram College, University of Delhi |
| 27th March, 2021 | Talking Science to Mathematics teachers | Dr. Gagan Gupta, Dept. of Mathematics, IIT Bombay |
| 28th August, 2021 | Using Havard's Visible Thinking Toolbox for Teaching and Evaluation in Mathematics | Dr.Roselle D'Souza, IBDP Math Educator, Canada |
| 30th October, 2021 | Empowerment through Creative Problem Solving | Ms. Sunita Shah, Educational Consultant in Mathematics |

| | | |
|---|---|---|
| 27th November, 2021 | A Mind for Mathematics | Dr. Shamim Suryavanshi, Ph.D. in Education and Life Coach |
| 29th January, 2022 | Universalizing Math Learning | Dr. Vivek Monteiro, Ph.D. in Physics, Principal Advisor to Navnirmiti Group of Organisations |
| 26th March, 2022 | Reflective Teaching in Mathematics | Ms. Ruchi Kumar, Centre of Excellence, TISS |
| 30th July, 2022 | Art Integrated teaching in Mathematics | Ms. Sunita Shah, Educational Consultant in Mathematics |
| 27th August, 2022 | Teaching and Learning of Mathematics in Endemic and beyond | Prof. Inder Rana, Dept. of Mathematics, Adjunct Professor, IIT Bombay |
| 24th September, 2022 | Mathematics in the social domain does it strengthen or hinder democracy? | Dr. K.S. Subramaniam, Professor, HBCSE-TIFR |
| 26th November, 2022 | Constructivism in Mathematics | Dr. Ashwini Halbe, Associate Professor, Department of Education, University of Mumbai |
| 31st January, 2023 | Straight Lines aren't always straight | Dr. Anoop Skaria, Assistant Professor, SIES College of Arts, Science and Commerce |

**The Research investigations carried out are the following :**

1. Modes of Curriculum Integration in Mathematics teaching - learning
2. Teacher's perception of textbook analysis
3. Methods of conceptual understanding in Mathematics
4. Parental Involvement in Mathematics Educaiton
5. Gender Bias in Mathematics
6. Mathematics Counselling
7. Attitude toward Mathematics as a subject and an option for career
8. Reflective teaching in Mathematics
9. Digital Learning in Mathematics
10. Critical thinking in Mathematics
11. Mathematical Creativity perception and development

Dr. Vini Sebastian
Pedagogy Master
Principal In Charge

ST. XAVIER'S INSTITUTE OF EDUCATION
40-A, New Marine Lines
MUMBAI-20

# Tips for Math Teachers: Making Math Fun and Easy to Learn

QUICK TIPS

A good mathematics teacher is like a magician in the classroom. You have the opportunity to shape young minds and instil a love for numbers, problem-solving, and critical thinking. To excel in this role, here are some valuable tips that can help you create a dynamic and engaging learning environment.

1. **Cultivate a Positive Attitude:** Your attitude towards the subject can greatly influence how your students perceive mathematics. Approach the subject with positivity. Show your students that mathematics is not just a set of rules and equations, but a fascinating journey of exploration and discovery.
2. **Build Strong Foundations:** Mathematics is built upon a hierarchy of concepts. Make sure everyone understands the basics before moving to harder stuff.
3. **Foster Critical Thinking:** Encourage students to think critically by presenting them with questions that don't have one right answer. Allow them to explore multiple approaches and solutions, promoting creativity and analytical skills.
4. **Relate to Real Life:** Connect mathematical concepts to real-world applications. Show students how mathematics is relevant in everyday life. This connection can increase their interest and motivation to learn.
5. **Utilize Technology Wisely:** Incorporate technology, such as interactive apps and educational websites, to enhance learning. Virtual simulations, graphing tools, and educational games can make learning mathematics easier and fun.
6. **Differentiate Instruction:** Some students learn differently. Give extra help to those who find it hard, and extra challenges to those who find it easy.
7. **Encourage Collaboration:** Let students work together in pairs or groups. They can help each other learn and see different ideas.
8. **Provide Timely Feedback:** Give feedback on assignments and assessments regularly. Highlight both strengths and areas for improvement. Clear feedback helps students understand their progress and helps them get better.
9. **Celebrate Mistakes:** Create a classroom culture where mistakes are viewed as opportunities for learning. Discuss errors openly and encourage students to analyse them. This approach reduces their fear of failure and promotes resilience.
10. **Set Realistic Goals:** Set achievable small goals for each lesson. When students reach these goals, they feel proud and want to learn more.
11. **Friendly Teacher:** Be friendly and approachable. Students should feel comfortable asking questions and getting help.
12. **Keep Learning:** Learn new teaching methods and tricks. It makes you a better teacher and helps students learn better. Attend workshops, conferences, and webinars to enhance your teaching skills.

By using these ideas, you can make mathematics enjoyable and understandable for your students.

**-Dr. Selby Jose**

# "Melodies of Math"

**Finding it too difficult to remember the integration steps?**
**Let's have fun singing integration songs.**
**Here we go… sing along with me…**

## SUBSTITUTION METHOD

**Kya karein**- Substitution
**Kab karein**- 1) Ganda angle or ganda power dikhe
2) Niche ka deri upar, upar ka deri baju me

**Bollywood song- Chittiyaan Kalaiyaan Ve**

Substitution…×2
Jab ganda angle tujhke dikhe
Ya ganda power pade tere piche… ×2

**('t' usko leneka jiska derivative ho)**

Substitute karke 't' leke aa re ……×2
dt mein laaiya re…
formula lagaiya re
k answer 'x' me aaiya re hey! } ×2

## ENTRIYA

**Kya karein**- Entriya
**Kab karein-**

**Bollywood song- Tune mare Entriyaan**

Sin cos ne maari entriyaan
Dil me baji ghantiya
Put t tan tan tan
Aadha
Tan tan tan
Sin cos ko 't' mein laao
I mein 't' ghusoa } ×2

Aage integrate karke geog lagao
Put t tan tan tan
Aadha
Tan tan tan

## ALGEBRA KA PARIVAR

**Kya karein-** Alegbra ka parivan
**Kab karein-** $\frac{(poly)^n}{(poly)^n}$ ; $\frac{(poly)^n}{(poly)^{n+1}}$ $\frac{(poly)^n}{(poly)^{n+m}}$

**Bollywood song- Sooraj dooba he**

Power same
Uppar niche
Power same
Albra ka dabra
Karle tu
Integrate karle abhi } x2

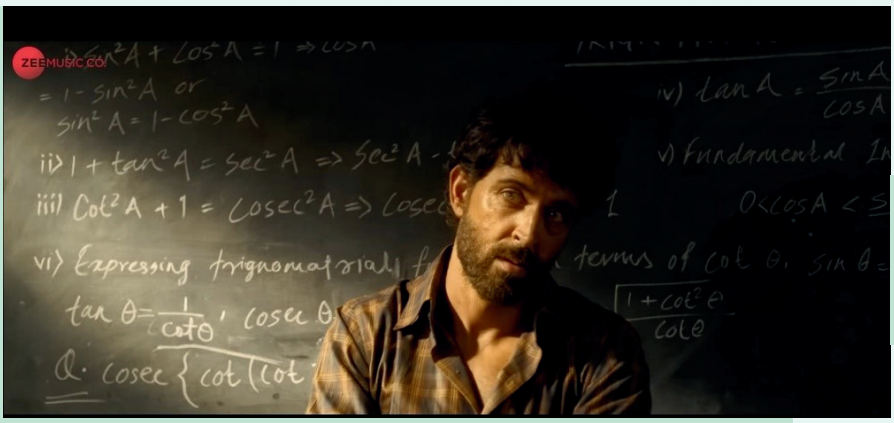
Niche power jyada ho jaaye
Ek power jyada ho jaaye
Adjust derivative is tarah se kare
Inti pahuche yaha se waha

Power bada hai yaaro
Division bulao yaaro
Q+R/D daalo sambhalke

Ask me for anything
I can give you everything
Algebric sums hai yeh
3 type ke…

**-Ritesh Khandelwal**

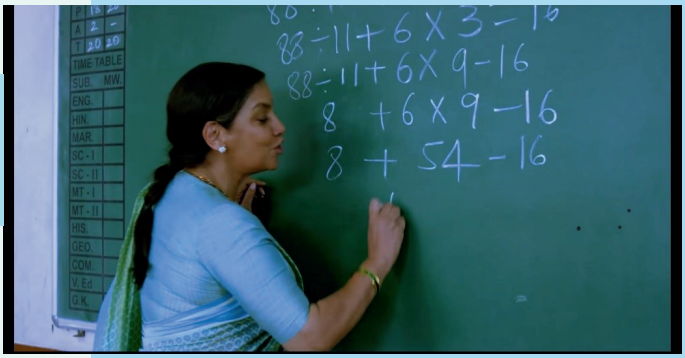
# 31 "Counting Beats: Math in Bollywood Music"



https://www.youtube.com/watch?v=XsZ43UTGQ_Q

Question mark (Super 30)

Bodmas ( Chalk and Duster)



https://www.youtube.com/watch?v=JXVGoXesitY

Maths mein dabba gul

https://www.youtube.com/watch?v=Ooi7g1ML1Bo

Pass nahi toh fail nahi

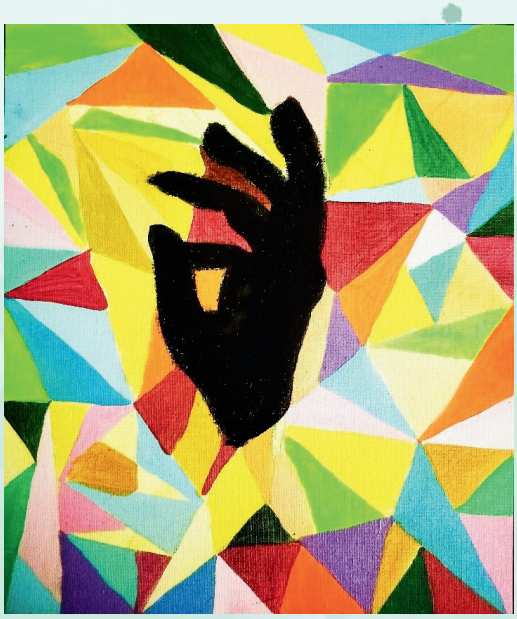
https://www.youtube.com/watch?v=4vvO9JE9djU

Pass nahi toh fail nahi

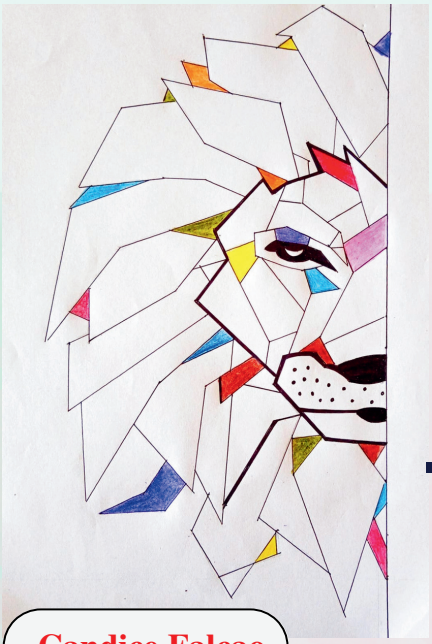
https://www.youtube.com/watch?v=bxGXhK5AKoQ

(Batch 2021-23)

# "Geometric Artistry"



-Cheryl Rodricks

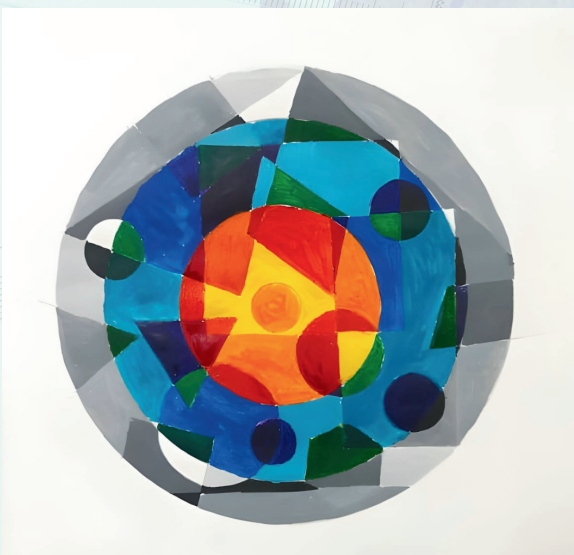


-Candice Falcao

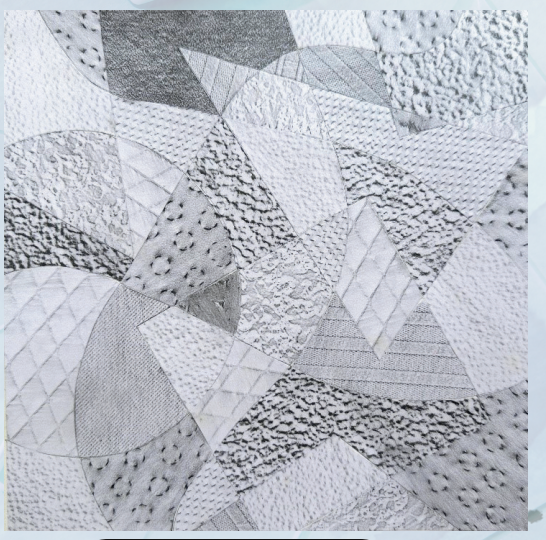
-Griselle Pereira

-Priya Collaso

"Mathematics is the music of reason; art is the soul's melody."
- Keith Devlin

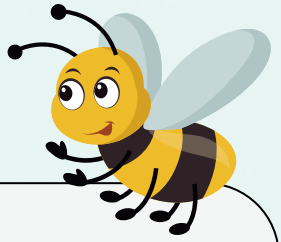


-Mohit Barla



-Griselle Pereira

# The Geometry of Images: Mathematical Patterns in Pictures"

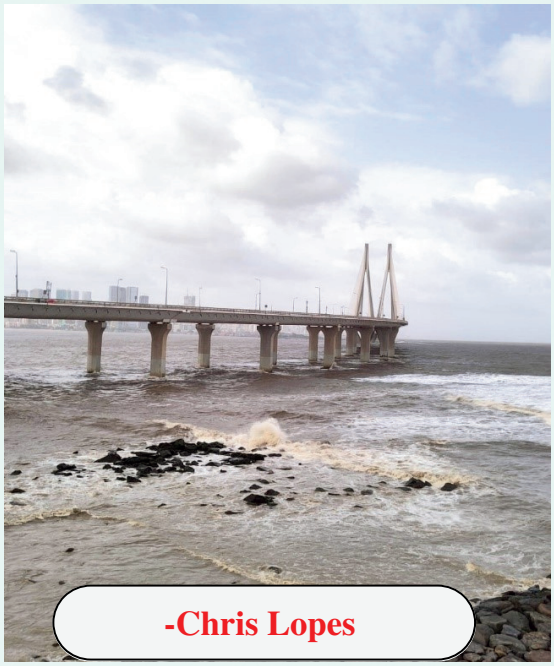


01. Bees love geometry. What's their favorite figure?

02. I add five to nine and get two. The answer is correct, but how?

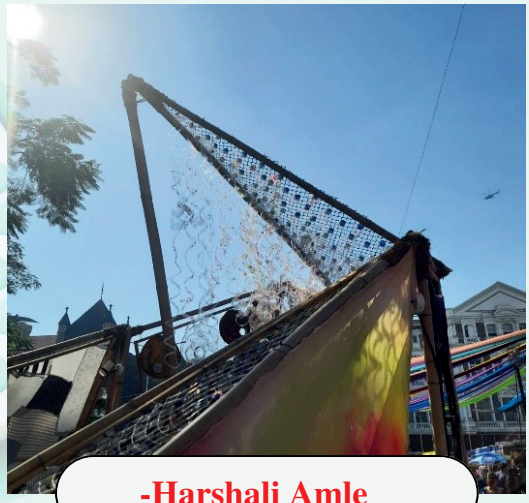
03. Figures with sides have it, but a circle doesn't. What is it?

-Creamita D'silva

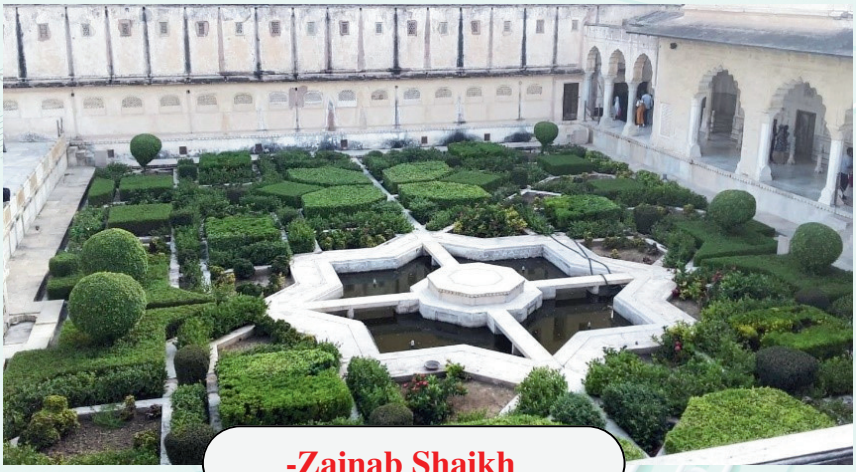


-Chris Lopes

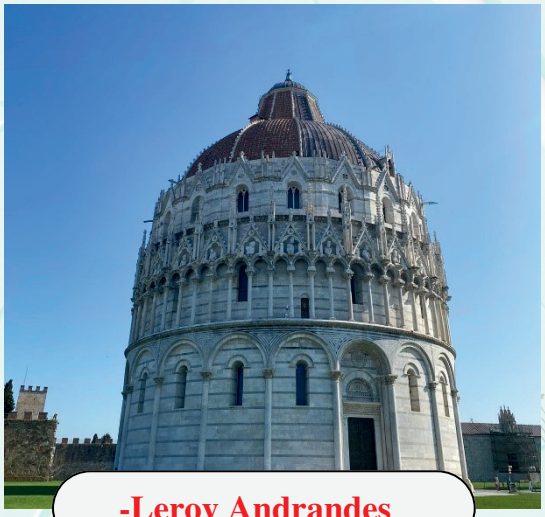

-Russell D'souza



-Harshali Amle

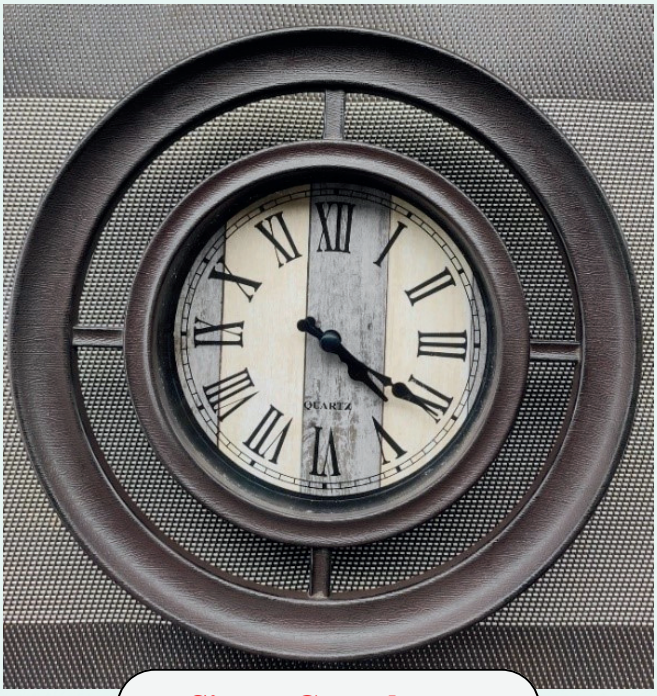


-Zainab Shaikh



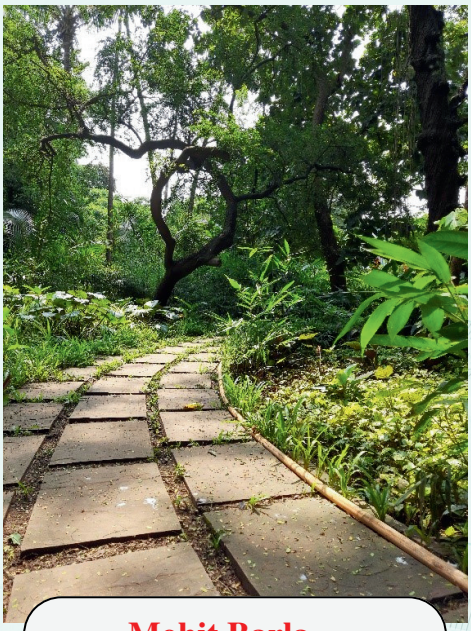
-Leroy Andrandes

**Pi INTERNATIONAL Day is celebrated on March 14th (3/14) around the world.**



-Sinera Gonsalves

-Creamita D'silva

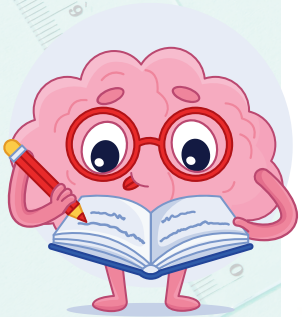


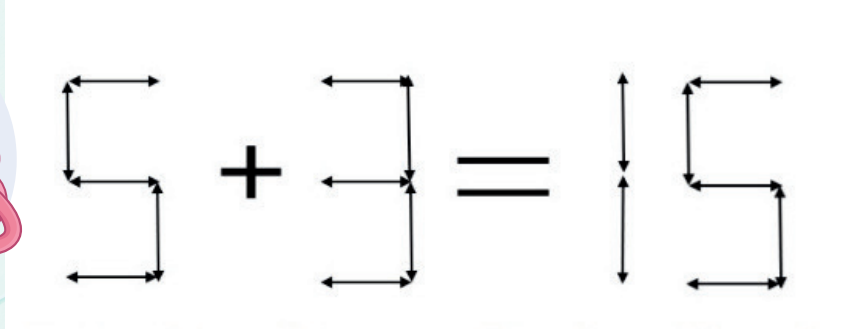
-Mohit Barla

-Priya Collaso

-Leroy Andrandes

## Brain Teaser



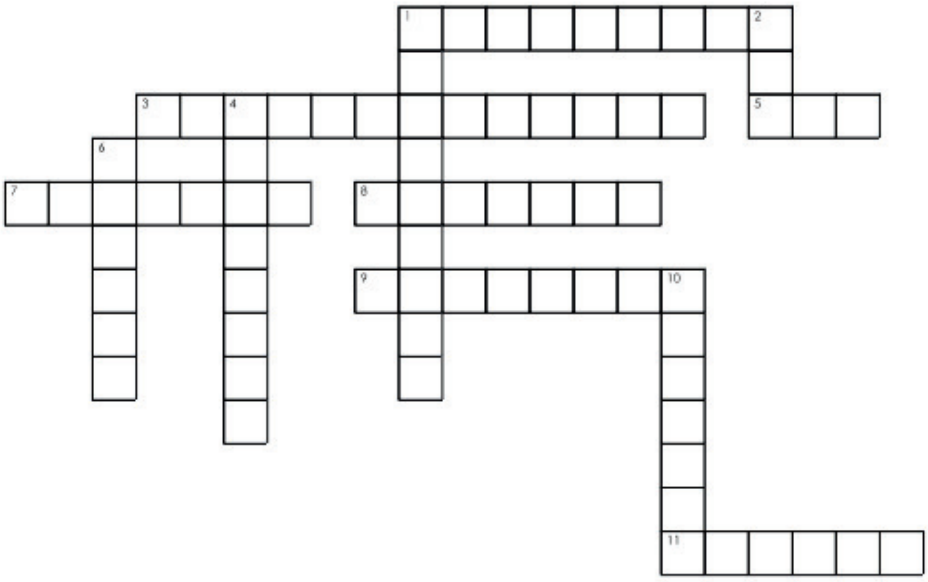


-Ayesha Ansari

**Instruction-**

Move 2 lines and solve the above equations


## CROSSWORD



**Across**: →

1. Alternate angles are _____.
3. Interior angles are _____.
5. Neither prime nor composite
7. A triangle with no two side equal.
8. Two numbers having only 1 as common factor
9. longest chord of circle
11. _____ intersect circle at 2 points.

**Down**: ↓

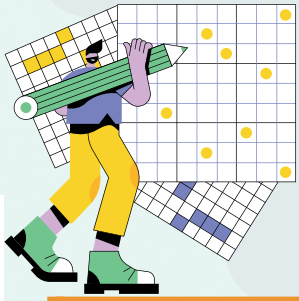
1. Number which has two factors.
2. Even prime
4. geometrical shape with five side.
6. Distance from the center of the circle.
10. Quadrilateral whose all sides are equal___

Word Bank:

| | | |
|---|---|---|
| RHOMBUS | ONE | COPRIME |
| CONGRUENT | SUPPLEMENTARY | TWO |
| DIAMETER | SECANT | PENTAGON |
| COMPOSITE | SCALENE | RADIUS |

-Allina Pereira

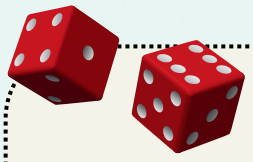
# SUDOKU



"The study of mathematics, like the Nile, begins in minuteness but ends in magnificence." — Charles Caleb Colton

## 9 X 9

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 4 | 2 | 8 | 5 | 3 | 9 | 6 |
| 2 | 8 | 5 | 3 | 9 | 6 | 4 | 1 | 7 |
| 3 | 9 | 6 | 4 | 1 | 7 | 5 | 2 | 8 |
| 4 | 1 | 7 | 5 | 2 | 8 | 6 | 3 | 9 |
| 5 | 2 | 8 | 6 | 3 | 9 | 7 | 4 | 1 |
| 6 | 3 | 9 | 7 | 4 | 1 | 8 | 5 | 2 |
| 7 | 4 | 1 | 8 | 5 | 2 | 9 | 6 | 3 |
| 8 | 5 | 2 | 9 | 6 | 3 | 1 | 7 | 4 |
| 9 | 6 | 3 | 1 | 7 | 4 | 2 | 8 | 5 |



**The numbers on opposite sides of a dice always add up to seven.**

## 8 X 8

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 7 | 5 | 3 | 2 | 8 | 6 | 4 |
| 2 | 8 | 6 | 4 | 3 | 1 | 7 | 5 |
| 3 | 1 | 7 | 5 | 4 | 2 | 8 | 6 |
| 4 | 2 | 8 | 6 | 5 | 3 | 1 | 7 |
| 5 | 3 | 1 | 7 | 6 | 4 | 2 | 8 |
| 6 | 4 | 2 | 8 | 7 | 5 | 3 | 1 |
| 7 | 5 | 3 | 1 | 8 | 6 | 4 | 2 |
| 8 | 6 | 4 | 2 | 1 | 7 | 5 | 3 |

## 6 X 6

| | | | | | |
|---|---|---|---|---|---|
| 1 | 5 | 3 | 2 | 6 | 4 |
| 2 | 6 | 4 | 3 | 1 | 5 |
| 3 | 1 | 5 | 4 | 2 | 6 |
| 4 | 2 | 6 | 5 | 3 | 1 |
| 5 | 3 | 1 | 6 | 4 | 2 |
| 6 | 4 | 2 | 1 | 5 | 3 |

**Use the numbers 2, 3, 4, and 5 and the symbols + and = to make a true math equation.**

## 4 X 4

| | | | |
|---|---|---|---|
| 1 | 3 | 2 | 4 |
| 2 | 4 | 3 | 1 |
| 3 | 1 | 4 | 2 |
| 4 | 2 | 1 | 3 |

# Posters of Great Mathematicans

## ISAAC NEWTON

BORN: 4thJanuary, 1643
DIED: 31stMarch, 1727

English mathematician, physicist, astronomer, theologian and author

### CONTRIBUTIONS TO MATHEMATICS

1.Newton's Fundamental Theorem of Calculus
2.Newton –Raphson Method
3.Generalized Binomial Theorem

### CONTRIBUTIONS TO OTHER FIELDS

1.Laws of Motion
2. Gravitation
3. Optics

### BOOK

PRINCIPIA MATHEMATICA


"What we know is a drop, what we don't know is an ocean."

## SOFIA KOVALEVSKAYA

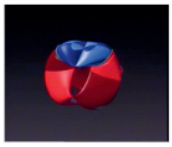
BORN: 15 January, 1850
DIED: 10 February, 1891

Russian Mathematician and writer

### CONTRIBUTIONS TO MATHEMATICS

1. Cauchy – KovalevskayaTheorem
2. Euler's Equations
3. Completed three papers on partial differential equations, abelian integrals and Saturn's rings

### DID YOU KNOW?



Sofia Kovalevskaya was the world's first female professor of mathematics

"Say what you know, do what you must, come what may."

## KARL WEIERSTRASS

BORN: 31 October, 1815
DIED: 19 February, 1897

German mathematician often cited as the "Father of Modern Analysis"

### CONTRIBUTIONS TO MATHEMATICS

1.Definitions ofLimitand Continuity of a function
2.Weierstrass M –test for convergence of series, etc.

### AWARDS AND ACHIEVEMENTS

1. He was conferred an honorary doctorate by the University of Konigsberg
2. He was made a Fellow of the Royal Society in 1881 and was awarded the Royal Society Copley Medal in 1895

"A mathematician who is not also something of a poet will never be a complete mathematician."

## BRAHMAGUPTA

(598 –668 AD)
Indian mathematician and astronomer

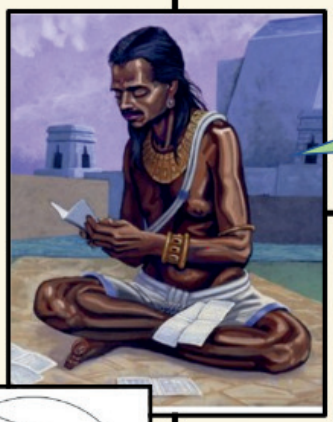
He improved number systems and made significant strides in astronomy. In 628, he wrote Brahmasphutasiddhanta which consists of 25 chapters.

Positive x positive = positive

Positive x negative = negative

Negative x positive = negative

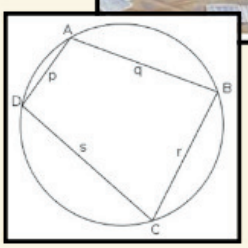
Negative x negative = positive



I was the first one to use the number 0

### BRAHMAGUPTA'S FORMULA

"The approximate area is the product of the halves of the sums of the sides and opposite sides of a triangle and a quadrilateral. The accurate area is the square root from the product of the halves of the sums of the sides diminished by each side of the quadrilateral."




"As the sun eclipses the stars by his brilliancy, so the man of knowledge will eclipse the fame of others in assemblies of the people if he proposes algebraic problems, and still more if he solves them."

### SUM OF SERIES

He gave the sum of, a series of cubes and a series of squares for the first n natural numbers as follows:

$$1^2 + 2^2 + \ldots\ldots + n^2 = \frac{(n)(n+1)(2n+1)}{6}$$

$$1^3 + 2^3 + \ldots\ldots + n^3 = \left(\frac{n(n+1)}{2}\right)^2$$

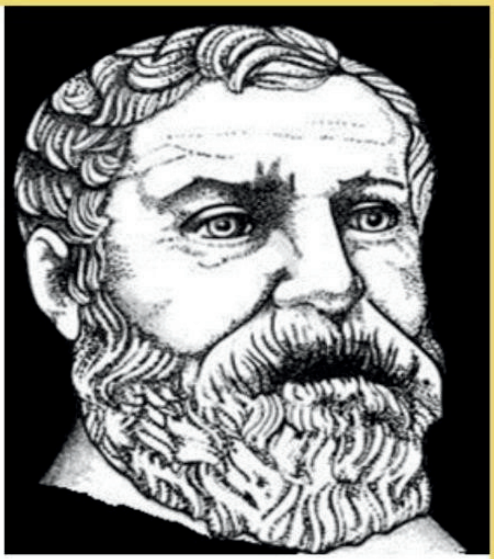
*A debt minus zero is a debt.*
*A fortune minus zero is a fortune.*
*Zero minus zero is a zero.*
*A debt subtracted from zero is a fortune.*
*A fortune subtracted from zero is a debt.*
*The product of zero multiplied by a debt or fortune is zero.*
*The product of zero multiplied by zero is zero.*
*The product or quotient of two fortunes is one fortune.*
*The product or quotient of two debts is one fortune.*
*The product or quotient of a debt and a fortune is a debt.*
*The product or quotient of a fortune and a debt is a debt.*

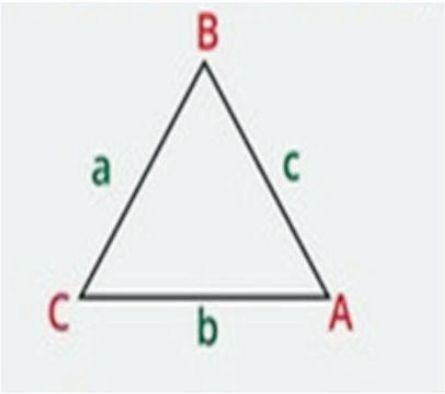
As a result of his admiration for Brahmagupta's intelligence, Bhaskara II (AD 1150) bestows on him the honorific title of "Ganita Chakra Chudamani" (the gem of the circle of mathematicians) and respectfully refers to him as "Mahamatiman" (very intelligent person).

-Samantha Vaz

# Heron of Alexandria

## AD 10 -AD 75






A is the area of the triangle,
a, b and c are the sides,
s is the semi perimeter of the triangle.

Heron's formula:

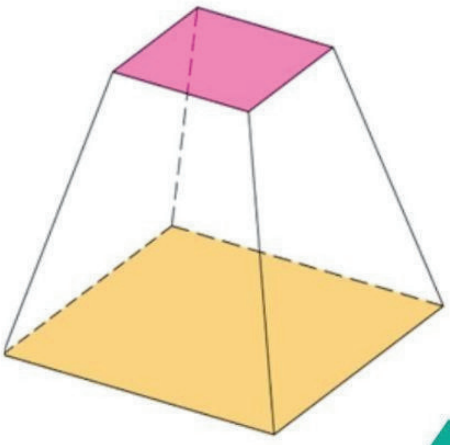
$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{a+b+c}{2}$$

The Heronian mean H of two non- negative real numbers A and B is given as follows:

$$H = \frac{\left(A + \sqrt{AB} + B\right)}{3}$$

Height of the frustum x Heronian mean = Volume of the frustum



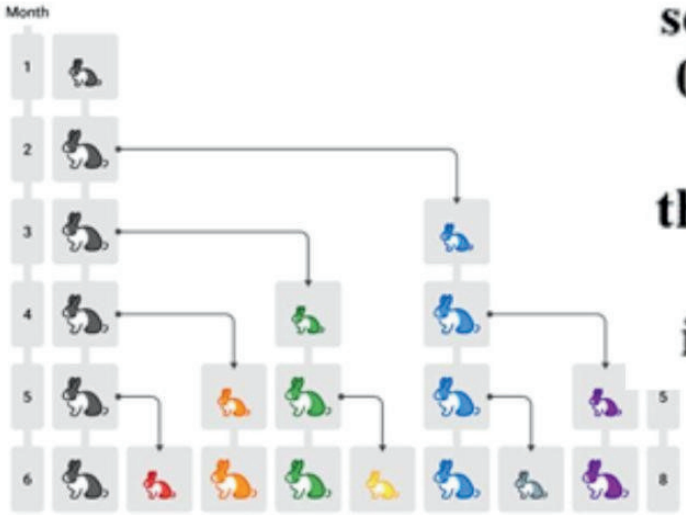
$ax^2 + bx + c = 0$

A = √(s(s-a)(s-b)(s-c) )
s = (a+b+c)/2

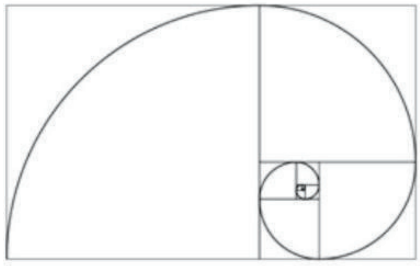
Nissy E. Daniel

# Leonardo Fibonacci

**1170-1250**




**Fibonacci sequence is a sequence which begins with 0 and 1 and the remaining numbers are the sum of the two preceding numbers. 0,1,1,2,3,5,8,13,21,34,… is the Fibonacci sequence.**



**Fibonacci wrote Liber Abaci (The book of Calculation /Abacus) in 1202 and introduced the Hindu- Arabic number system in the European countries.**

$ax^2 + bx + c = 0$

Nissy E. Daniel

# MATHEMATICIANS

Hypatia, (born c. 355 ce—died March 415, Alexandria), mathematician, astronomer, and philosopher. Effective long division method, She also wrote an article on conic sections.


$$e^{i\pi} + 1 = 0$$

Leonhard Euler, (born April 15, 1707, Basel, Switzerland—died September 18, 1783, St. Petersburg, Russia), Swiss mathematician and physicist, one of the founders of pure mathematics. Created Mathematical notation, Euler's Identity, Euler's Formula, List of theorems and methods.


Georg Cantor, (born March 3, 1845, St. Petersburg, Russia—died January 6, 1918, Halle, Germany), German mathematician who founded set theory and introduced the mathematically meaningful concept of transfinite numbers, indefinitely large but distinct from one another.

Emmy Noether, in full Amalie Emmy Noether, (born March 23, 1882, Erlangen, Germany—died April 14, 1935, Bryn Mawr, Pennsylvania, U.S.), German mathematician whose innovations in higher algebra gained her recognition as the most creative abstract algebraist of modern times.

# MATHEMA

-Ayesha Ansari & Candice Falcao