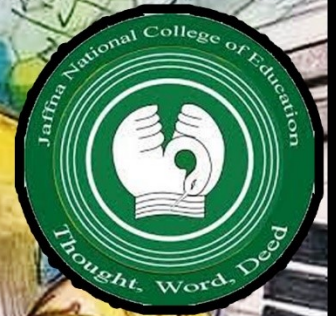


Jaffna National College of Education

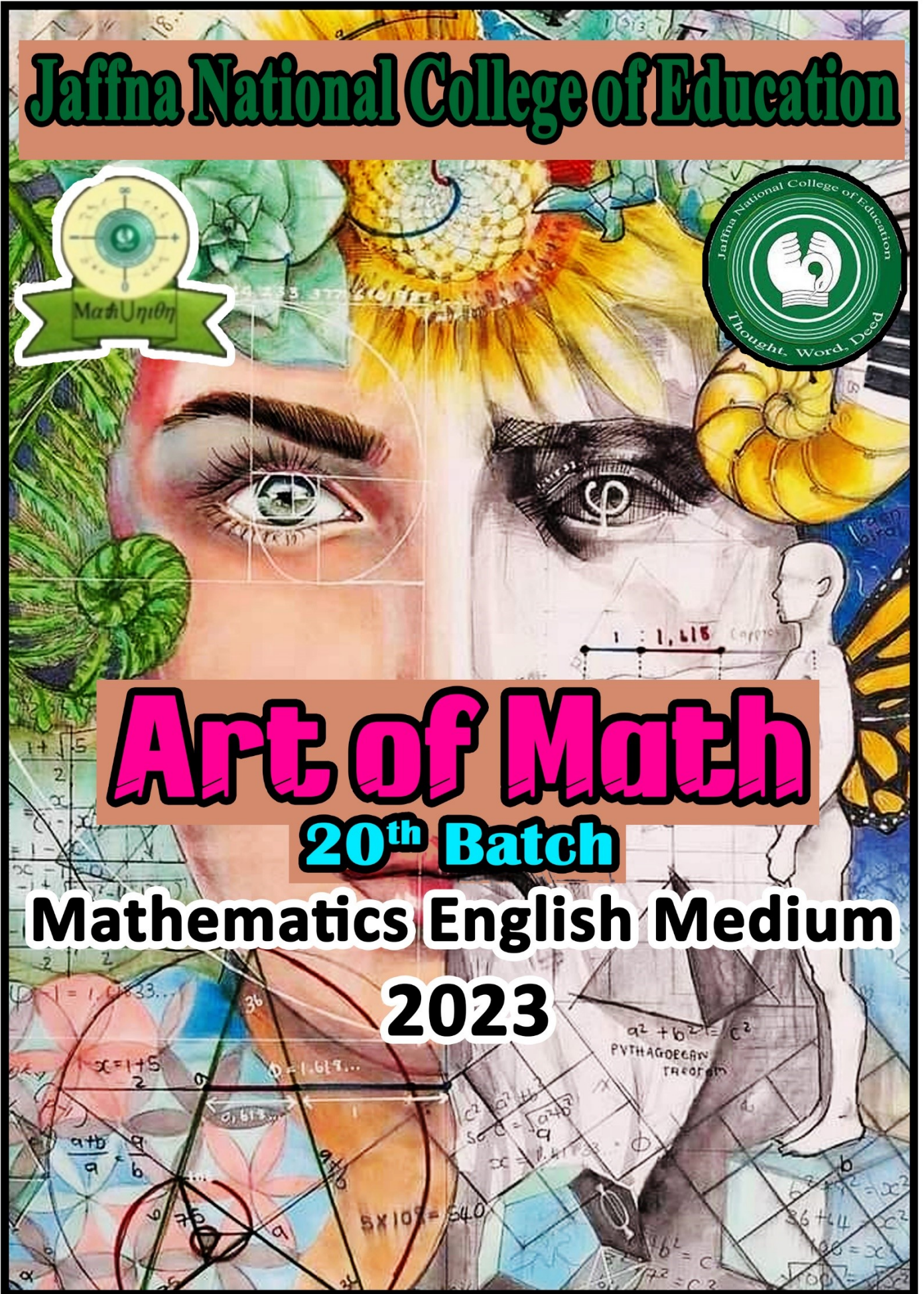


Art of Math

20th Batch

Mathematics English Medium

2023



A message from President,



Build your skills not your resume.

The future belongs to those who learn more skills and combine them in creative ways.

It gives pleasure to note that the student teachers of Maths English medium (behalf of math union) are bringing their own creation 'Art of Math' for the year 2023.

I congratulate the students and members of Art of Math for their efforts and contribution.

I congratulate our Teacher educator Mr. A. Gugan (Vice patron of Math union) who provide the platform and encourage the students.

I wish our prospective teachers to be the starts on the world of education.

God Bless you.

Mr. S. Paramanatham

(President of JNCoE)

A Message from vice president



Mathematics is the most beautiful and most powerful creation of the human spirit without mathematics

There's nothing you can do.

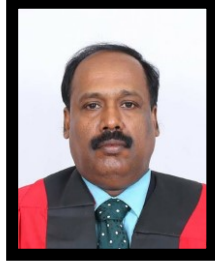
Appreciate the 20th batch Maths English Medium student teachers for their creation. "Art of Math" In this book they included short articles, general questions and Facts, related to mathematics which are very useful to all.

I congratulate our vice patron Mr. A. Gagan sir for his guidance. I wish our prospective teachers to get success in each steps they take towards their Profession.

Mr. T. Jeyakandeepan

Vice President (Finance and Administration) of JNCoE.

A Message from Vice president



‘In Mathematics ,the art of proposing a question must be held of higher value than solving it’.A Teacher is the one who supports the students to express their skills. So I appreciate 20th Maths English Medium Student Teachers for their skills.

Mathematics improves the critical thinking among the students. The publication of “Art of Math” is a success of the Maths English Medium Student Teachers.

I am very proud about their unity and hard work. I wish them for their better future.

Mr .T.Thavanesan

Vice President (Academic & Assurance) of JNCoE.

Blessing from vice patron



It is a great pleasure in blessing for the Publication of “Art of Maths” released by the maths union of Jaffna National College of education.

Our Maths Union conduct many activities to enhance the maths Knowledge, skill and attitudes among the prospective teachers.

Program develop the mathematic skills “Art of Maths” among the prospective teachers. It is essential to mention here that these Prospective teachers are updating their knowledge and the skills not only the subject area but also in the publication procedures. We hope this experience will help them to produce more Publication in future.

This book Consist of collection of question and answer with key notes. As a matter of fact this book meaningful and fruitful to the students in school.

I wish and congratulate the members of the maths anion towards for hard work the publication and join effort of Art of maths".

Mr. A, Gugan

Vice Patron of Math union

A Message from woman of letters



I am Enlightened to deliver my message for the magazine Art of Math. Mathematics is very thrilling and it has been a lifetime passion for all. As a prospective teacher of 21st century we should develop skills regarding mathematics among the students to lead day to day life activities and self-employment.

I hope that our articles will deepen your interest towards mathematics and inspire you to embrace the power of mathematical thinking. Mathematics is not just a subject to be learned but a language to be spoken, a tool to solve complex problems, a source of endless joy, way of recreation and it is a scientific application.

I would like to thank our president, vice presidents, vice patron, our course in – charge and prospective Maths English medium teachers who helped us to publish this magazine.

Subahary Senthilrajah

Author of Art of Math

Pens

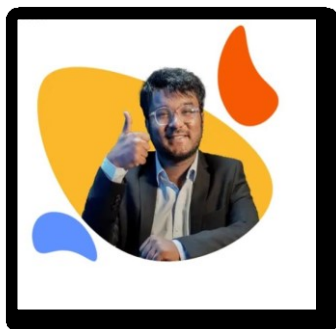
- A.N.A.Niras
- S.Luckshiga
- G.Vinitha Mathumitha
- S Shomiga
- V.Nilaxana
- N.Mohana
- T.Thuvaraga
- H.Fatima Afrin
- M.Kopyram
- T.Senthilkumaran
- K.Pirinthan
- S.Subahary
- R.Sanjaka



Art of Math Members

- S.Subahary
- G.Vinitha Mathumitha
- K.Pirinthan
- S.Luckshiga
- R.Sanjakan

Fastest Human Calculator



Neelakantha Banu Prakash (born 13 October 1999) is a human calculator, youtuber and entrepreneur from Hyderabad, India, and is titled as the "World's Fastest Human Calculator". He won gold in the 2020 Mental Calculation World Championship at Mind Sports Olympiad 2020. He also holds 50 limca records for his mathematical calculations.

He finished BSc in mathematics from St. Stephen's College Delhi. Gold Medalist, Mental Calculation World Championship, Mind Sports, Limca Book of Records 2015, 2016 and India's Youth Icon 2020

He is the founder of 'Bhanzu', a math educational tech startup aiming to improve the mathematical skills of learners. He has broken 4 World Records and 50 Limca Records, including records once held by Shakuntala Devi. He also won India's First Gold Medal at the Mind Sports Olympiad. He visited 23 countries, conducted 500 stage shows and impacted 2 million students.

Neelakantha says through Bhanzu, we are inculcating a culture among students to question the first principles of math. Students are afraid of mathematics, which not only makes them perform poorly in schools but also discourages them from taking up careers in STEM fields where maths plays a crucial role,” He said that “Since childhood, math is taught as a subject where you rote learn the formulae, solve questions, and score marks. We want students to not just treat math as a school subject, but to fall in love with it. This enhances their problem-solving skills and builds cognitive abilities, eventually leading to the amplification of their numeracy skills,”



Subahary Senthilrajah
2020/JNCoE/MA/E/F/4200

CALCULATION IN MATHEMATICS

Calculation is a fundamental cognitive process that underpins various aspects of our daily lives. It involves using mathematical operations to find numerical results, solve problems, and make informed decisions.

In mathematics, calculation encompasses addition, subtraction, multiplication, and division, along with more advanced operations like exponentiation and root extraction. These operations serve as building blocks for solving complex mathematical equations and problems across various fields, from science and engineering to finance and statistics.

In daily life, calculation plays a crucial role in budgeting, shopping, cooking, and countless other activities. It helps us manage finances, determine recipe quantities, and plan travel routes. In professional settings, accurate calculations are essential for tasks such as accounting, data analysis, and project management.

The advent of calculators and digital tools has simplified many calculations, making them quicker and more accurate. However, understanding the principles behind calculations remains essential for critical thinking, problem-solving, and mathematical literacy.

In conclusion, calculation is a universal skill that empowers individuals to navigate both the mathematical intricacies of various disciplines and the practical challenges of everyday life.

S.Luckshika
2020/MA/E/F/4083

Series – 01

1. Rewrite the number below in scientific notation?
348,245
2. $3x - 5y = 2$, what is $x/4y$?
3. Which number is the larger?
 $2^{55}, 3^{22}$
4. A car is travelling at the rate of 86km/h, how many meter is the car travelling in one minute?
5. If $(a-b) = (b-c) = 3$, What is the value of $\{(a-b)^2+(b-c)^2\}/(a-c)^2$

Series – 02

1. What is 4% of 218?
2. If $2a+b=5$ and $3a+5b= 42$, what is the average of a, b?
3. What is 49 in roman number?
4. $4+4=20$, $5+5=30$, $6+6=42$, $7+7=?$
5. what is the equation for area of a circle?

Series - 03

1. $2+3=10$, $8+4=96$, $7++2=63$, $6+5=66$, $9+5=?$
2. A larger box contains 18 small boxes and each small box contain 25 chocolate bars. How many chocolate bars are in the larger box?
3. Using only an addition, how can you add number 08 to get 1000 by using only 08times?
4. To complete a work “A” need 10 days. “B” need 20 days, “C” need 30 days. How many days need they work together?
5. I am an odd number, if you take one letter from me, then “i” become even, Which number is “i”

Series – 04

1. $A+A+A=39$, $B+B-A=25$, $6+C+B=50$, $A+B+C=?$

2. Express the number of “Two crore ninety lakh five thousand eight hundred” in figures
a)29055100 b)209055800 c)2955800 d)29055800
3. Which 03 numbers have the same answer whether they’re added or multiplied together
4. If $72*96=6927$, $58*87=7885$, then $79*86=?$
5. If a recipe requires 400grams of potatoes for 04 people, how many kilograms would be required for 12 people?

Series – 05

1. $1+4=5$, $2+5=12$, $4+6=28$, $8+11=?$
2. Two bells ring at intervals of 06 minutes & 08 minutes respectively. If they both ring together at 8.00am, at what time will they ring together again?
3. Shanika’s DOB is 2014.11.13. Aheli is 1 Year, 08 Months & 25 Days older to her. What is Aheli’s DOB?
4. A farmer has cultivated paddy in an area of $3\frac{1}{2}$ square kilometers to vegetables in an area of $1\frac{2}{5}$ square kilometers. Find the cultivated area?
5. In a school the total enrollment of class 8th is 1115. If the number of boys exceeds the number of girls by 33, Find the number of boys in a class 08th
A)74 B)89 c)50

Unlocking the Power of Self-Reflection: A Path to Personal Growth in Education

In the fast-paced world of education, where knowledge is abundant and information flows freely, we often forget to look within ourselves for answers. Amidst the hustle and bustle of exams, assignments, and extracurricular activities, lies a transformative tool waiting to be utilized—the power of self-reflection. Embracing this practice can unlock a treasure trove of personal growth, paving the way for academic success and holistic development. Self-reflection, like a compass guiding us through the educational journey, provides a unique opportunity to delve into our thoughts, feelings, and experiences. By taking a moment to pause and contemplate, we gain valuable insights into our learning process, strengths, and areas for improvement. It is a powerful tool to identify our learning style, enabling us to tailor our study techniques to maximize effectiveness. As students, self-reflection empowers us to take ownership of our educational experiences. By understanding our motivations and goals, we become architects of our destiny, steering ourselves towards academic achievements that align with our aspirations. With self-awareness as our ally, we are better equipped to set realistic objectives and devise strategies to accomplish them, leading to a sense of purpose and fulfillment. Moreover, self-reflection nurtures resilience—the armor that shields us during challenging times. By acknowledging our setbacks and learning from them, we cultivate a growth mindset that embraces failure as a stepping stone towards success. We learn to bounce back from disappointments, armed with newfound determination and resilience to conquer academic hurdles. Beyond academic success, self-reflection also fosters emotional intelligence—an indispensable life skill. As we understand and manage our emotions, we build healthier relationships with peers, teachers, and family members. This emotional maturity enhances our communication, empathy, and cooperation, creating a harmonious and nurturing learning environment for everyone. In the age of constant digital distractions, self-reflection provides a retreat—a chance to unplug from screens and plug into our inner world. It

encourages mindfulness and stress reduction, essential components for maintaining mental well-being in the demanding world of education. So, let us embrace the power of self-reflection in our educational pursuits. Let it be our guiding star, illuminating our path towards self-discovery, academic excellence, and personal growth. By cultivating the habit of self-reflection, we equip ourselves with the tools needed to navigate the ever-changing tides of education, emerging wiser, stronger, and better prepared for the challenges that lie ahead. As we unlock the potential within, we unlock the key to success in both education and life.

T. Senthilkumaran
2020 /JNCOE /MA /E /M /4198

TOP AWARDS IN MATHS



The Fields Medal: The Fields Medal Is One Of The Most Recognized Prizes Given To Mathematicians Who Have Achieved Something Great During Their Career. The Official Title For This Prize Is The International Medal For Outstanding Discoveries In Mathematics And It Is Given Out Once Every Four Years To Up To Four Mathematicians Under The Age Of 40. The Prize Is Given At The International Congress Of The International Mathematical Union Which Is Only Held Every Four Years And It Is The Most Prestigious Medal In The Field Of Mathematics.

Abel Prize: This Prestigious Prize Is Actually Presented By A King – The King Of Norway – To A Mathematician Who Is Outstanding In Their Field Of Study. It Is Named After Niels Henrik Abel, A Popular Norwegian Mathematician When It Was First Created In 2001. Some Even Call This The Nobel Prize Of Mathematics.

Wolf Prize In Mathematics: The Wolf Foundation Of Israel Awards Six Different Prizes Each Year And One Of Them Is The Wolf Prize In Mathematics. This Prize Has Been Awarded Since 1978 And It Is Also A Very Prestigious Honor To Receive One In The Fields In Which They Are Given. Some Of The Recent Recipients Of The Wolf Prize In Mathematics Include Peter Sarnak, Michael Artin, George D. Mostow, Luis Caffarelli And Micheal Aschbacher.



Chern Medal: One Of The Newer Prizes In Mathematics Is The Chern Medal, Which Began Recognizing Lifetime Achievements For Mathematicians In 2010, Is Awarded Every Four Years. It Is Given Out At The International Congress Of Mathematicians And It Includes A Prize Of \$250,000. The First Recipient In 2010 Was Louis Nirenberg And The 2014 Winner Was Phillip Griffiths.

N.Mohana

2020/MA/E/F/4087

Series - 07

1. Rewrite the number below in scientific notation?
360,123
2. $3x - 5y = 2$, what is $8x/32y$?
3. Which number is the larger?
 $5^{22}, 3^{33}$
4. A car is travelling at the rate of 75km/h, how many meter is the car travelling in one minute?
5. If $(a-b) = (b-c) = 2$, What is the value of $\{(a-b)^2 + (b-c)^2\} / (a-c)^2$

Series - 08

6. What is 8% of 207?
7. If $2a+b=7$ and $b+2c= 23$, what is the average of a, b, c?
8. What is 40 in roman number?
9. $4+4=20$, $5+5=30$, $6+6=42$, $7+7=56$, $8+8=?$
10. Name what is the longest chord of a circle

Mathematics reveals its secrets only to those who approach it with pure love 🥰

Invisible Maths 🤖



There is a decimal point at the end of each whole number
 $10 = 10.0$ 👉

Every number has an exponent one

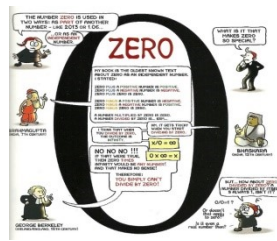
There is a coefficient of one to the left side of each variable
 $X = 1X$ 👉

There is denominator of one for each number
 $3 = 3/1$ 👉

There is a positive sign to the left of every number
 $5 = +5$ 👉



Who invented the zero?



It might seem like an obvious piece of any numerical system, but the zero is a surprisingly recent development in human history. In fact, this ubiquitous symbol for “nothing” didn’t even find its way to Europe until as late as the 12th century.

Zero’s origins most likely date back to the “fertile crescent” of ancient Mesopotamia. Sumerian scribes used spaces to denote absences in number columns as early as 4,000 years ago, but the first recorded use of a zero-like symbol dates to sometime around the third century B.C. in ancient Babylon. The Babylonians employed a number system based around values of 60, and they developed a specific sign—two small wedges—to differentiate between magnitudes in the same way that modern decimal-based systems use zeros to distinguish between tenths, hundreds and thousandths. A similar type of symbol cropped up independently in the Americas sometime around 350 A.D., when the Mayans began using a zero marker in their calendars.

These early counting systems only saw the zero as a placeholder—not a number with its own unique value or properties. A full grasp of zero’s importance would not arrive until the seventh century A.D. in India. There, the mathematician Brahmagupta and others used small dots under numbers to show a zero placeholder, but they also viewed the zero as having a null value, called “sunya.” Brahmagupta was also the first to show that subtracting a number from itself results in zero. From India, the zero made its way to China and back to the Middle East, where it was taken up by the mathematician Mohammed ibn-Musa al-Khowarizmi around 773. It was al-Khowarizmi who first synthesized Indian arithmetic and showed how the zero could function in algebraic equations, and by the ninth century the zero had entered the Arabic numeral system in a form resembling the oval shape we use today.

The zero continued to migrate for another few centuries before finally reaching Europe sometime around the 1100s. Thinkers like the Italian mathematician Fibonacci helped introduce zero to the mainstream, and it later figured prominently in the work of Rene Descartes along with Sir Isaac Newton and Gottfried Leibniz's invention of calculus. Since then, the concept of "nothing" has continued to play a role in the development of everything from physics and economics to engineering and computing.

Source: <https://www.history.com/.amp/news/who-invented-the-zero>

UPDATED: AUG 22, 2018 | ORIGINAL: JAN 22, 2014

BY [HISTORY STAFF](#)

H. FATIMA AFRIN
20/JNCOE/MA/E/F/4091

Series -16

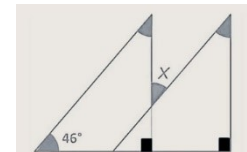
Q1)matrix has equal number of column and row.

Q2) Find X?

Q3) what is half of $8^{\frac{1}{2}}$

Q4) $X + Y = 1$, $X - Y = 5$ solve this linear equations and find the value of x and y?

Q5) if $2=6$, $3=12$, $4=20$, $5=30$... $9=?$



1) Square 2) $X = 44^\circ$ 3) $2^{\frac{1}{2}}$ 4) $X = 3$, $y = (-2)$ 5) 90

Series - 14

Q1) find the product of $131 \times 4 \times 0 \times 320$?

Q2) what is the initial name of zero?

Q3) which people first used negative numbers?

Q4)..... used a triangle to derive Pythagoras theorem.

Q5) what comes after trillion?

Q1) 0

Q4) Pythagoras

Q2) cipher

Q5) Quadrillion

Q3) Chinese

Establishing mathematics lab in school

Mathematics laboratory is a place where students can learn and explore mathematical concepts and verify mathematical facts and theorems through a variety of activities using different techniques.

Ways to establish mathematics lab

Arrange Mathematical sets.

Hang charts and pictures.

Shows graphs and geometrical theorem.

Remove unnecessary books, irrelevant posters and clutter from the area.

Clear the whiteboard, and tidy the desks.

Place enough tables and chairs for the expected number of students in the room.

Allow rooms for students to work.

Hangs some pictures of mathematicians. (Isaac Newton, Pythagoras)

Use some technology devices

E.g.-

Computers, smart board, calculator, and overhead projector paste some job images related to mathematics.

Explanation about the jobs & qualifications.

Some applications of math's in daily life.

Have separate sections for games & puzzles and library which have collection of math's related books



Advantages of math's lab for teachers and students.

For teachers

Provide teachers to teach math's in different ways.

Can give support to students.

Can teach two or more classes in same time.

Can easily implement and evaluate.

No need to worry about things.

Easily engage the students.

Able to improve skills.

Less disturbance.

Easy to guide the students.

Get good experience.

Easily identify the students don't have interest in mathematics.

Can get favorable attitude about mathematics among students.



For students

Get confident.

Improve interest in mathematics.

Get practical knowledge.

Able to solve the problems.

Able to handle technical equipment.

Discover new things.

Know about the importance of mathematics.

Help to choose their career.

Change the attitude towards mathematics.

Develop scientific attitude.

Improve creative knowledge.

Things we should take care in mathematics lab

Furniture

Equipment

Electrical things like electrical calculator

Measuring instruments like tapes and balance.

Subahary Senthilrajah (Maths EM)

2020/JNCoE/MA/E/F/4200

Series - 11

REGULAR PROFITS FROM EMPLOYMENT (RESIDENT/ NON-RESIDENT CITIZEN)	RATE
First LKR 100,000/-	Exempt
Second LKR 50,000/-	4%
Third LKR 50,000/-	8%
Fourth LKR 50,000/-	12%
Fifth LKR 50,000/-	16%
Sixth LKR 50,000/-	20%
Exceeding LKR 350,000/-	24%

Q1) who discovered zero (0) in mathematics?

Q2) How to call the triangle which has 02 sides exactly same length?

Q3) what is the smallest natural number?

Q4) convert this ratio as fraction?
3:5

Q5) How much should a person whose annual income is Rs. 230,000.00 pay as income tax according to the following table?

1) Aryabhata 2) Isosceles

3)1

4)3/5

5) Rs. 9600

Why do Students Struggle with MATHEMATICS

Mathematics is a universal language that can become very confusing as the content continues to stretch with more advanced skills. Difficulties in mathematics can occur in many ways. Some struggling mathematics learners will have difficulty recalling basic computational skills. This may be due to not mastering the appropriate skill level at an early age. Some students will struggle with making connections between numbers and the quantities they represent. Also, understanding how symbols relate directly to math can be a difficult concept to grasp. And finally, many students who struggle to understand math oftentimes do not know the language. The language of math includes unique terminology, symbols, word problems, and verbal explanations that are not in everyday use by many young students who struggle. Math is abstract, not always tangible, and multi-computational. Because math builds on itself, the importance of mastering skills as a student learns them is the top priority. But, like most things, students will master these levels at different times. Therefore, teachers must decide on appropriate accommodations for their students. Offering multiple opportunities for students to learn can influence their success.

SHOMIGA SOTHILINGAM

2020/JNCoE/MA/E/F/4186

BODMAS

In mathematics, while solving the arithmetic equations i.e. mathematical operations on numbers we have to obey some rules and then only we will get the correct answer. It looks like a simple but not like that, we have to solve the numerical carefully according to BODMAS.

BODMAS is the acronym which is having meaning bracket, orders or powers, division or multiplication, addition or subtraction. It gives the order of operations we have to do while solving the problems.

Hence, first we have to solve brackets, then we have to solve orders i.e. power or root terms then we have to solve division or multiplication as which comes first from left side of the equation and finally we have to do addition or subtraction.

Kirushnakumar Pirinthan

2020/JNCoE/MA/E/F/4199

Series- 18

Q1) 22, 21, 23, 22, 24, 23.. ?

Q2) which prime number is closest to 100?

Q3) No. Of hours in a week?

Q4) How to call the top number of fraction?

Q5) $3(X+5) = 6X-3$ find the value of x?

Series- 17

Q1) what is the supplement of 50° ?

Q2 8, 14, 22, 32?

Q3) when ashram was four years old, her brother was half of her age. Now she is 24 years old. How old is her brother?

Q4) place the correct symbols to balance the equation

(/, -, +, ×)? $10_2_6_3 = 22$

Q5) Find the number of triangles in this figure?

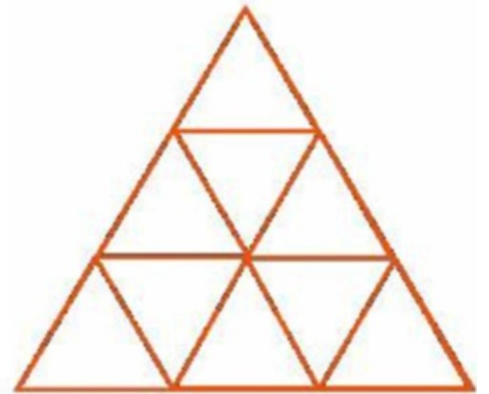
1) 130°

2) 44

3) 22

4) / + ×

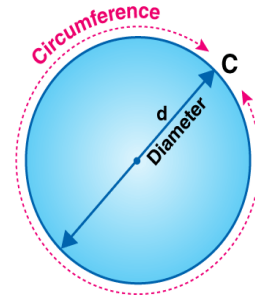
5) 13



Circumference of A Circle

What is Pi (π)?

Pi (π) is the ratio of a circle's circumference to its diameter. The diameter of a circle is the distance from edge to edge (measuring through the center), and the circumference is the distance around the circle.



$$\frac{\text{Circumference}}{\text{Diameter}} = \pi = 3.14159.....$$

After measuring circle objects for thousands of years, it has always been determined that a circle is a little more than 3 times its width around. And because pi is a “constant number”, it will always be the same for any circle of any size.

Why we use Pi (π) for finding area of a circle?

Circle being a curved shape, it was difficult to depend upon a certain dimension. It was observed that the circles' area and circumference depends upon its diameter. Initially, the circles' circumference was measured roughly using threads. The ratio of the circumference and the diameter, i. e. (Circumference/Diameter) among the circles was observed to be similar but not equal. Aryabhata defined the irregularity of this ratio to be an irrational number. He also found the value of this ratio upto five significant as pi.

$$\text{i.e. } \pi = (\text{Circumference}) / (\text{Diameter})$$

$$\text{Hence, } \text{Circumference} = \pi * \text{Diameter} = \pi * 2(\text{Radius})$$

$$\text{And also, } \text{Area} = (\text{Circumference}/2) * \text{Radius}$$

$$= \pi (\text{Radius}) * \text{Radius}$$

$$= \pi * (\text{Radius})^2$$

Miss. Nilaxana Varatharasa

2020/JNCoE/MA/E/F/4188

EUREKA



Archimedes was a Greek buoyancy .he is most famously known for his discovery of the principle of buoyancy .His exclamation EUREKA! .Archimedes taking a bath. the king had commissioned the crafting of a crown as a gift to the gods and he suspected that the goldsmith had substituted some of the gold with a cheaper metal .Archimedes was asked to determine if the crown was made of pure gold without damaging it.

While Archimedes getting into a bath and noticed water overflowing. He realized that the amount of water displaced. That He could determine the volume of the crown by filling a tub with water in a certain level. Placing the crown in the water, the measuring the amount of water that overflowed .then he calculated the density of the gold crown by dividing its weight by its volume, and compare this with the density of pure gold. Its density would be the same as that of the bar of gold of similar size. Archimedes famously shouted EUREKA that mean ‘I HAVE FOUND IT’’. The story has since become a symbol of a sudden, joyful realization or discovery.

T.Thuvaraga

2020/MA/E/F/4090

Series - 15

Q1) scientist..... was born on pi day?

Q2) in number 20 what is the power of 0?

Q3) what mathematical word is used to indicate the likelihood of something occur?

Q4) what is the Roman number of 70?

Q5) $(x+5) - 12 = 16$ find the value of x?

Q1) Albert Einstein

Q2) 1

Q3) probability

Q4) LXX

Q5) 23

Series - 13

Q1) Name the only even prime number?

Q2) How many seconds are there in a day?

Q3) which film is inspired by Srinivas Ramanujan?

Q4) OND= 11, UES=22, EDN =33,

HUR=44, RID =55, UND =?

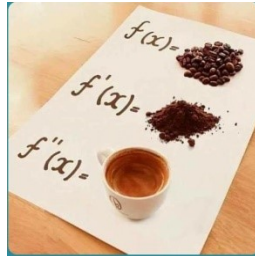
Q5) Find the interior angle of the polygon with sides 6?

Q1) 02 Q2) 86,400 seconds Q3) the man who know infinity

Q4) 77 Q5) 120°

Enlightened by Math

This is what we mean by differentiation



$$\text{Life} = \int_{\text{birth}}^{\text{death}} \frac{\text{happiness}}{\text{time}} \Delta \text{time}$$

Why it's pizza?

Radius = z, Thickness = a

$$\text{Volume} = A = \pi r d^2 a$$

$$= \text{Pi } (Z)^2 a$$

$$= \text{pizza}$$



$$\text{Log } \text{😄} = \text{💧}$$

$$\log (\text{😄}) = \text{💧} \log \text{😄}$$

Series - 10

Q1) who is the father of Mathematics?

Q2) how many zeros are there in One Billion?

Q3) what is the name of the polygon which has 08 sides?

Q4) $X/Y = 4/7$

$Y/Z = 3/2$

Find X/Z

Q5) which phobia happen because of extreme fear of numbers?

Dead line:-03.02.2023

Q1) Archimedes Q2) nine Q3) Octagon Q4) 6/7

Q5) Arithmophobia/Numerophobia

Series - 19

Q1) how many months make a decade?

Q2) A square has a sides of length 'a', find the lengths of the diagonals?

Q3) who is known as the prince of mathematicians?

Q4) $3-5+225x(63\div 7)$? (Show your steps)

Q5) 2, 9, 30, 93?

Answers

1)1200 2)2 power of $1/2a$ 3) Karl Fredric cause 4)2023

5)282

A letter from mathematician

Pi, £ lane

US.

My dear gravitational center,

Till Monday my life path was a straight line, after that day that path changed as a parabola. You know why because in your rectangular house I saw you when I was passing through your trigonometry junction. An arrow from your spherical eyes attacked my cardioid shape heart with a tangent which contained magnitude of 30° depression angle. Because you are 30 cm shorter than me.

You came as an axiom to the love at first sight theorem which I could not prove till now. Since from my birth my heart was a null matrix. I have infinity love for you and I will be a real root for your quadratic equation. Probability of getting your love is 0.5. I assure you till my last breath if you integrate or differentiate the magnitude of my love will not change like e^x

Like my mathematics teacher I will be waiting for your accurate answer. Hint (You can use any mathematical method to check me). And for further details see your log table.

This compass box is a small gift from me. I hope you accept this.

Yours no limit

Bilateral symmetric man

Rhombus (Son of Ramanujan).

Subahary Senthilrajah

2020/JNCoE/MA/E/F/4200

Trigonometry

Trigonometry is one of the important branches in the history of mathematics that deals with the study of the relationship between the sides and angles of a [right-angled triangle](#). This concept is given by the Greek mathematician Hipparchus. In this article, we are going to learn the basics of trigonometry such as trigonometry functions, ratios, trigonometry table, formulas and many solved examples

What is Trigonometry?

Trigonometry is one of the most important branches in mathematics that finds huge application in diverse fields. The branch called “Trigonometry” basically deals with the study of the relationship between the sides and angles of the right-angle triangle. Hence, it helps to find the missing or unknown angles or sides of a right triangle using the trigonometric formulas, functions or trigonometric identities. In trigonometry, the angles can be either measured in degrees or radians. Some of the most commonly used trigonometric angles for calculations are 0° , 30° , 45° , 60° and 90° .

Trigonometry is further classified into two sub-branches. The two different types of trigonometry are:

- Plane Trigonometry
- Spherical Trigonometry

In this article, let us discuss the six important trigonometric functions, ratios, trigonometry table, formulas and identities which helps to find the missing angles or sides of a right triangle.

Trigonometry Ratios-Sine, Cosine, Tangent

The trigonometric ratios of a triangle are also called the trigonometric functions. Sine, cosine, and tangent are 3 important trigonometric functions and are

abbreviated as sin, cos and tan. Let us see how are these ratios or functions, evaluated in case of a right-angled triangle.

Consider a right-angled triangle, where the longest side is called the hypotenuse, and the sides opposite to the hypotenuse are referred to as the adjacent and opposite sides.

Even and Odd Trigonometric Functions

The trigonometric function can be described as being even or odd.

Odd trigonometric functions: A trigonometric function is said to be an odd function if $f(-x) = -f(x)$ and symmetric with respect to the origin.

Even trigonometric functions: A trigonometric function is said to be an even function, if $f(-x) = f(x)$ and symmetric to the y-axis.

We know that

- $\sin(-x) = -\sin x$
- $\cos(-x) = \cos x$
- $\tan(-x) = -\tan x$
- $\operatorname{cosec}(-x) = -\operatorname{cosec} x$
- $\sec(-x) = \sec x$
- $\cot(-x) = -\cot x$

Therefore, cosine and secant are the even trigonometric functions, whereas sine, tangent, cosecant and cotangent are the odd trigonometric functions. If we know the even and odd trigonometric functions, it helps us to simplify the trigonometric expression when the variable inside the trigonometric function is negative.

Trigonometry Angles

The trigonometry angles which are commonly used in trigonometry problems are 0° , 30° , 45° , 60° and 90° . The trigonometric ratios such as sine, cosine and tangent of these angles are easy to memorize. We will also show the table where all the ratios and their respective angle's values are mentioned. To find these angles we have to draw a right-angled triangle, in which one of the acute angles will be the corresponding trigonometry angle. These angles will be defined with respect to the ratio associated with it.

For example, in a right-angled triangle,

$$\sin \theta = \text{Perpendicular/Hypotenuse}$$

$$\text{or } \theta = \sin^{-1} (P/H)$$

Similarly,

$$\theta = \cos^{-1} (\text{Base/Hypotenuse})$$

$$\theta = \tan^{-1} (\text{Perpendicular/Base})$$

Trigonometry Table

Check the table for common angles which are used to solve many trigonometric problems involving trigonometric ratios.

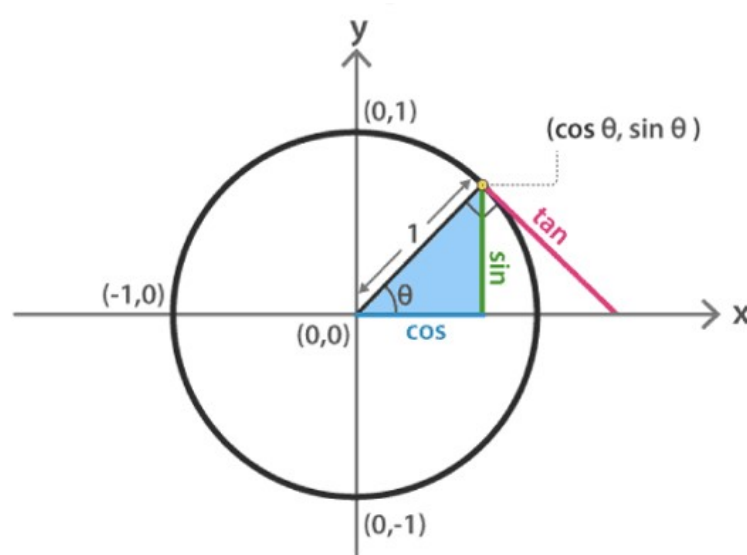
Angles	0°	30°	45°	60°	90°
Sin θ	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
Cos θ	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
Tan θ	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞

Cosec θ	∞	2	$\sqrt{2}$	$2/\sqrt{3}$	1
Sec θ	1	$2/\sqrt{3}$	$\sqrt{2}$	2	∞
Cot θ	∞	$\sqrt{3}$	1	$1/\sqrt{3}$	0

In the same way, we can find the trigonometric ratio values for angles beyond 90 degrees, such as 180° , 270° and 360° .

Unit Circle

The concept of unit circle helps us to measure the angles of cos, sin and tan directly since the centre of the circle is located at the origin and radius is 1. Consider theta be an angle then,



Suppose the length of the perpendicular is y and of base is x . The length of the hypotenuse is equal to the radius of the unit circle, which is 1. Therefore, we can write the trigonometry ratios as;

Sin θ	$y/1 = y$
Cos θ	$x/1 = x$
Tan θ	y/x

List of Trigonometry Formulas

The Trigonometric formulas or Identities are the equations which are true in the case of Right-Angled Triangles. Some of the special [trigonometric identities](#) are given below

1. Pythagorean Identities

- $\sin^2\theta + \cos^2\theta = 1$
- $\tan^2\theta + 1 = \sec^2\theta$
- $\cot^2\theta + 1 = \operatorname{cosec}^2\theta$
- $\sin 2\theta = 2 \sin \theta \cos \theta$
- $\cos 2\theta = \cos^2\theta - \sin^2\theta$
- $\tan 2\theta = 2 \tan \theta / (1 - \tan^2\theta)$
- $\cot 2\theta = (\cot^2\theta - 1) / 2 \cot \theta$

2. Sum and Difference identities-

For angles u and v , we have the following relationships:

- $\sin(u + v) = \sin(u)\cos(v) + \cos(u)\sin(v)$

➤ $\cos(u + v) = \cos(u)\cos(v) - \sin(u)\sin(v)$

➤ $\tan(u + v) = \frac{\tan(u) + \tan(v)}{1 + \tan(u)\tan(v)}$

➤ $\sin(u - v) = \sin(u)\cos(v) - \cos(u)\sin(v)$

➤ $\cos(u - v) = \cos(u)\cos(v) + \sin(u)\sin(v)$

➤ $\tan(u - v) = \frac{\tan(u) - \tan(v)}{1 + \tan(u)\tan(v)}$

3. **If A, B and C are angles and a, b and c are the sides of a triangle, then,**

Sine Laws

- $a/\sin A = b/\sin B = c/\sin C$

Cosine Laws

- $c^2 = a^2 + b^2 - 2ab \cos C$

- $a^2 = b^2 + c^2 - 2bc \cos A$

- $b^2 = a^2 + c^2 - 2ac \cos B$

Trigonometry Identities

The three important trigonometric identities are:

- $\sin^2\theta + \cos^2\theta = 1$

- $\tan^2\theta + 1 = \sec^2\theta$

- $\cot^2\theta + 1 = \operatorname{cosec}^2\theta$

Trigonometry Basics

The three basic functions in trigonometry are sine, cosine and tangent. Based on these three functions the other three functions that are cotangent, secant and cosecant are derived.

All the trigonometrical concepts are based on these functions. Hence, to understand trigonometry further we need to learn these functions and their respective formulas at first.

If θ is the angle in a right-angled triangle, then

- $\sin \theta = \text{Perpendicular/Hypotenuse}$
- $\cos \theta = \text{Base/Hypotenuse}$
- $\tan \theta = \text{Perpendicular/Base}$

Perpendicular is the side opposite to the angle θ .

The base is the adjacent side to the angle θ .

The hypotenuse is the side opposite to the right angle

The other three functions i.e. cot, sec and cosec depend on tan, cos and sin respectively, such as:

- $\cot \theta = 1/\tan \theta$
- $\sec \theta = 1/\cos \theta$
- $\text{cosec } \theta = 1/\sin \theta$

Hence,

- $\cot \theta = \text{Base/Perpendicular}$
- $\sec \theta = \text{Hypotenuse/Base}$
- $\text{cosec } \theta = \text{Hypotenuse/Perpendicular}$

Euler's Formula for trigonometry

As per the euler's formula,

$$e^{ix} = \cos x + i \sin x$$

Where x is the angle and i is the imaginary number.

$$\sin x = \frac{e^{ix} - e^{-ix}}{2i}$$

$$\cos x = \frac{e^{ix} + e^{-ix}}{2}$$

$$\tan x = \frac{(e^{ix} - e^{-ix})}{i(e^{ix} + e^{-ix})}$$

Kirushnakumar Pirinthan
2020/JNCoE/MA/E /M/4199

Techniques to teach mathematics

- Teaching mathematics effectively involves using a variety of techniques to develop different learning styles and abilities. Here are some techniques to consider:
- Visual Aids- Use visual aids like diagrams, charts, and graphs to help students visualize mathematical concepts. Visual representations can make abstract ideas more concrete.
- Hands-On Activities- hands-on activities such as blocks, or geometric shapes, to make math more interactive and engaging.
- Real-World Applications: Relate mathematical concepts to real-life situations. Show students how math is used in everyday activities like cooking, budgeting, or measuring.
- Problem-Solving- Encourage problem-solving by presenting students with real and challenging problems. This increase critical thinking and application of math concepts.
- Collaborative Learning-Group students to work on math problems or projects together. Collaborative learning can stimulate discussion and peer teaching.
- Use Technology educational software, calculators, and interactive online resources to enhance the learning experience.
- Questioning-Ask open-ended questions that require students to explain their thought process. This helps them understand and internalize the material.
- Math Games-conduct math games and puzzles into your teaching to make learning more enjoyable. Games can reinforce concepts in a fun way
- Active Learning: Encourage active participation in class through discussions, debates, and peer teaching. Active learning keeps students engaged.
- Feedback and Assessment: Provide timely and constructive feedback on students' work. Regular assessments can help identify areas that need improvement.

G. Vinitha Mathumitha

JNCoE /MA /E /F /4084

Apps and software related to Mathematics

- There are numerous mathematics-related apps and software available for various purposes. Here are some popular ones:
- Wolfram Alpha: A powerful computational engine that can answer a wide range of mathematical queries and solve equations.
- GeoGebra: A dynamic mathematics software that combines geometry, algebra, spreadsheets, graphing, statistics, and calculus.
- Mathway: A tool that helps you solve mathematical problems, from basic algebra to complex calculus.
- Desmos: An advanced graphing calculator implemented as a web application and a mobile app, suitable for visualizing mathematical concepts.
- Microsoft Excel: Useful for creating spreadsheets and performing various mathematical calculations.
- MATLAB: A high-level programming language and environment for numerical computing, often used in engineering and scientific fields.
- Graphing Calculator by Math lab: A feature-rich graphing calculator app for Android and iOS devices.
- Mathematica: A computational software system often used in academia and research for symbolic mathematics and data analysis.
- Maple: A mathematical software system for symbolic and numeric computing.
- These tools cover a broad spectrum of mathematical needs, from basic calculations to advanced research-level mathematics. You can choose the ones that best suit your requirements and preferences.

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