



Param Poojya Dr. Babasaheb Ambedkar Smarak Samiti's

Dr. Ambedkar College Deekshabhoomi, Nagpur

In association with

Sant Gadge Baba College, Hingna, Nagpur

Topic: "Intercollegiate National Mathematics Day
Celebrations 2021 and Poster Competition"

Organised by

Department of Mathematics

Dr. Ambedkar College, Deekshabhoomi, Nagpur

Date: 22nd December 2021

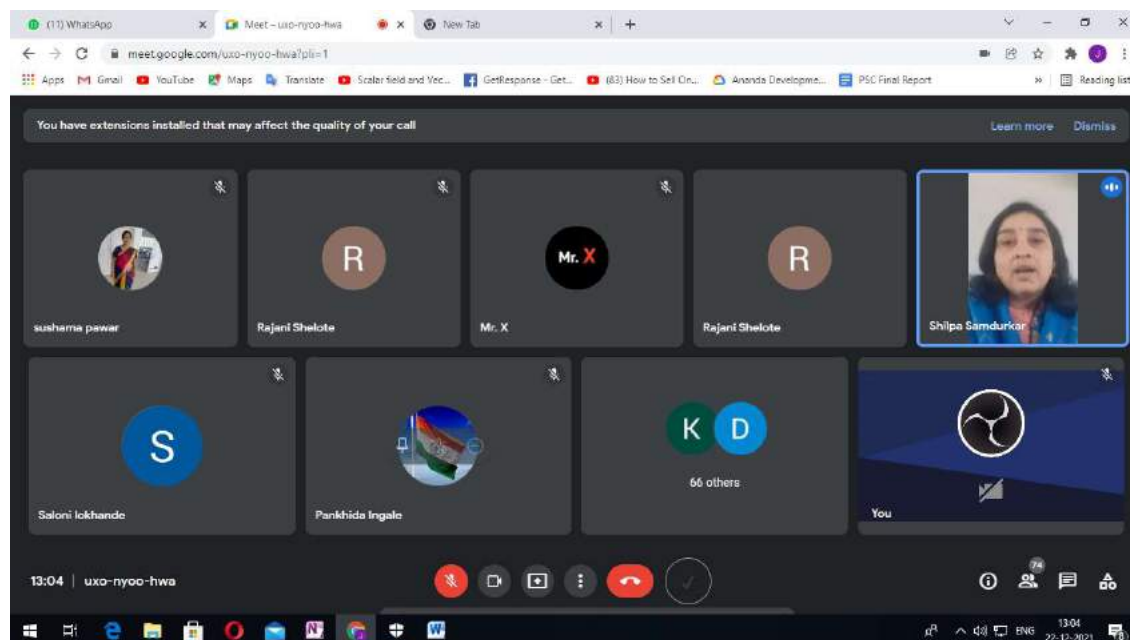
REPORT

Department of Mathematics, Dr Ambedkar College, Deekshabhoomi, Nagpur in association with Department of Mathematics, Sant Gadge Baba College, Hingna, Nagpur celebrated National Mathematics Day on 22nd December 2021. Government of India has declared 22nd December, the birthdate of Sri Srinivasa Ramanujan, a great mathematician from India as the National Mathematics Day.

On this occasion department of Mathematics conducts national mathematics day every year to make students aware of the great tradition of Mathematics in Indian society since ages.

Dr. Shilpa Samdurkar, Vidya Vikas Arts, Science and Commerce College, Samudrapur, presented a guest lecture on the life works of Srinivasa Ramanujan. In her lecture she began by describing his early childhood and the hardships he faced in his journey to become a mathematical genius in the early 20th Century in the British Ruled era. In the middle section of her presentation she aptly described Srinivasa Ramanujan's association with Sir G. H. Hardy, FRS (Himself a great mathematician) who was a professor in Trinity College, Cambridge. Sir Hardy pursued Srinivasa Rmamanujan to come to England and thus the new partnership with him began leading to the recognition of Ramanujan's work in the field of Mathematics. In the last part of her lecture, she summarised some the recognised works of Srinivasa Ramanujan in the area of Number theory, Infinite series, etc.

The screenshot of agenda is given below:



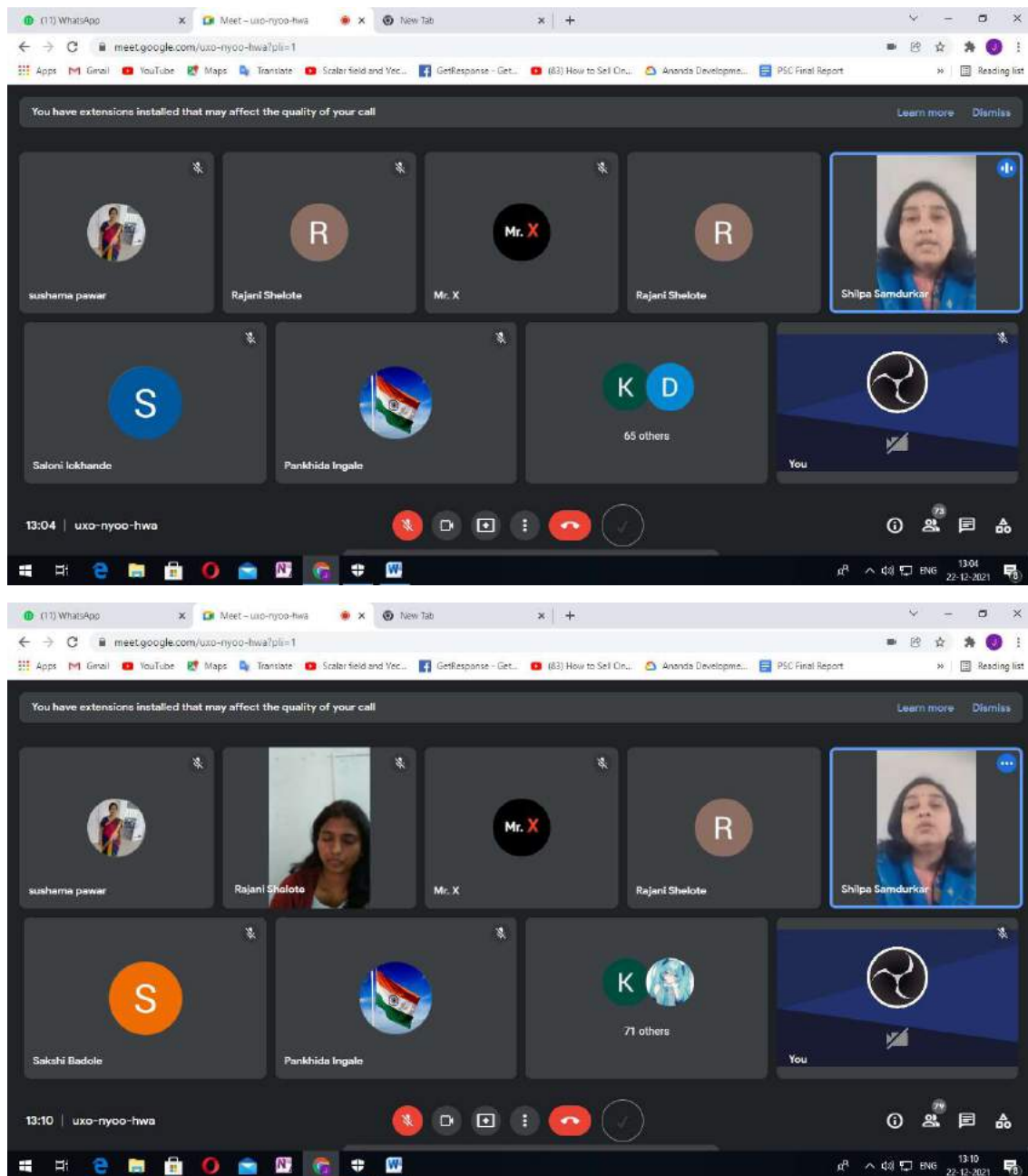


Fig: Agenda of the Guest Lecture

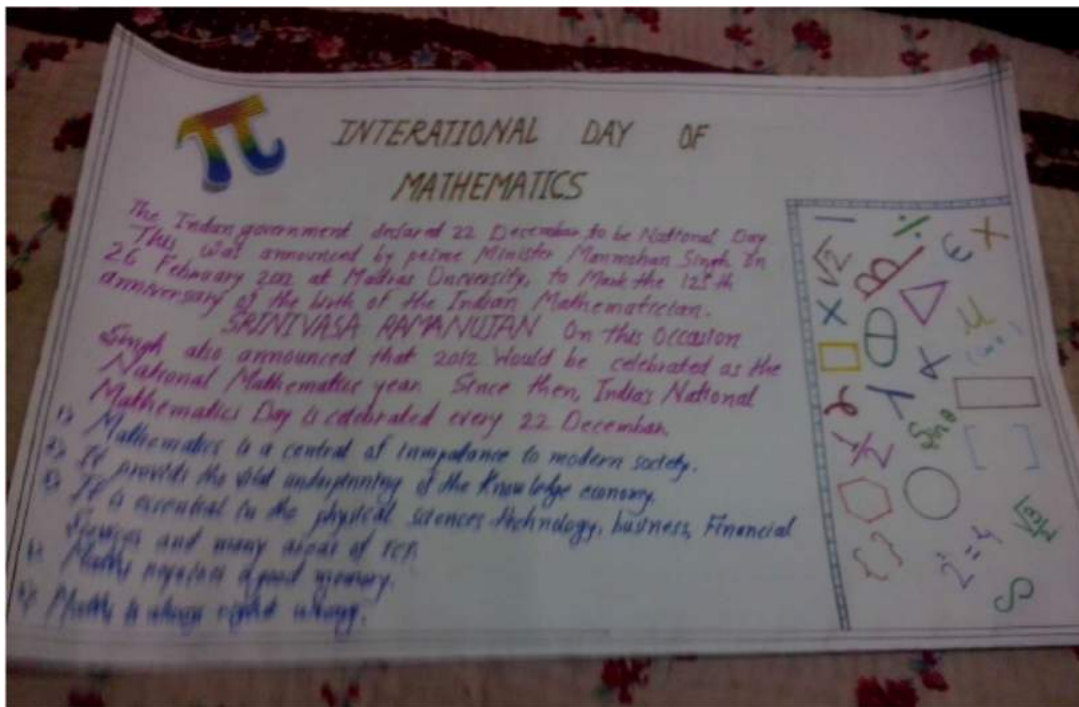
After the conclusion of the final session a formal vote of thanks was given by Dr. Jitesh Tripathi, Assistant Professor, Department of Mathematics, Dr. Ambedkar College, Nagpur. He declared that webinar has been successfully carried out with its main theme and imparted knowledge about the National Mathematics Day and its importance to the participants.

Then Prof. S. M. Pawar, Head, Department of Mathematics, Dr. Ambedkar College, Deekshabhoomi, Nagpur, gave her convenor's address in which she described about the activities conducted by the Department of Mathematics, Dr. Ambedkar College, Nagpur, every year to guide students for a successful career in Mathematics and to inspire them to pursue mathematics as a career option.

She also described about the present event and about the Poster presentation competition that was organised to commemorate National Mathematics Day Celebrations. Poster presentation was organised for the students of three prominent colleges in Rashtrasant Tukadoji Maharaj Nagpur University namely

1. Dr. Ambedkar College, Deekshabhoomi, Nagpur
2. Sand Gadge Baba College, Hingna, Nagpur
3. Kamla Nehru Mahavidyalaya, Nagpur.

Some of the Posters are shown below:










MATHEMATICAL CONTRIBUTIONS OF SRINIVASA RAMANUJAN

Ramanujan's Life and Passion	Born on December 22, 1887 in Palthalayam near Kumbakonam Tamil Nadu.	At the age of 12, he was declared "CHILD MATHEMATICIAN" by his teachers.	His findings came out of vision from his hometown goddess "Nammagal". He discovered much trigonometry by himself as a 13 year old boy.
Ramanujan's Mathematical contribution	Published his work in Journal of Indian Mathematical Society at the age of 23. wrote his 1 st formal paper for the journal on properties of Bernoulli Numbers. He focused mainly on developing the relationship between partial sum and products of hypergeometric series.	First problem which posed $\sqrt{1 + \sqrt{2 + \sqrt{3 + \dots}}}$ Instantly Ramanujan claimed that it was smallest natural number which can be written as sum of cubes in 2 ways $1729 = 1^3 + 12^3 = 9^3 + 10^3$ He independently discovered Bernoulli numbers and using these numbers, he formulated the value of Euler's constant up to 15 decimal places!	He then formulated an equation to solve the infinitely nested radicals $x + n + a = \sqrt{ax + (n+a)^2 + \dots}$ Apart from the contributions mentioned above, he was in some other areas of mathematics such as hypergeometric series, Bernoulli number, Fermat's last theorem. He nearly verified Fermat's last theorem which states that there are no three natural numbers x, y, z satisfying
Ramanujan's Honours	Awarded BA degree by research class called (PhD) in March 1918.	Became the first Indian to be elected a fellow of Trinity college, Cambridge.	Became a fellow of the Royal Society in 1918.

National Mathematical Day

23rd Dec 2017

Contributions of Indian Mathematicians

Brahmagupta  <ul style="list-style-type: none"> He was born in 597 CE near present-day Bhujapur. The most important contribution of Brahmagupta to mathematics was introducing the concept of computing method of zero (0). 	C.R. Rao  <ul style="list-style-type: none"> Rao was born in 1907. He is a well-known statistician. He is famous for his theory of estimation. He is known for Cramer-Rao bound & Rao-Blackwell theorem. 	Srinivasa Ramanujan  <ul style="list-style-type: none"> He was born in 1887. His important contributions in field are: <ul style="list-style-type: none"> Hardy-Ramanujan Littlewood circle method in number theory. Ramanujan's identities in the partition of numbers. Work on the algebra of inequalities. Elliptic functions. Continued fractions. Partial sums & partial product of hypergeometric series.
Aryabhata  <ul style="list-style-type: none"> He was born in 476 CE at Kusumapura. He was regarded as the 1st of the major mathematician-astronomer from the classical age. He worked on the "place value" system using letters to signify numbers & decimal qualities. He discovered the position of 3 planets and found that these planets revolved around the sun. 	P.C. Mahalanobis  <ul style="list-style-type: none"> P.C. Mahalanobis was born in 1899. He is known for Mahalanobis distance & Fisher's Mahalanobis metric. 	B. Bose  <ul style="list-style-type: none"> He was born in 1894. He is known for his collaboration with Albert Einstein. He is best known for his work on quantum mechanics. His famous contributions are: <ul style="list-style-type: none"> Bose-Einstein correlation. Bose-Einstein distribution. Bose-Einstein statistics. Bose gas. Bose gas. Photon gas. Photon gas as e^2 of a lot.
Dhaskar  <ul style="list-style-type: none"> He is born in 114 & also known as Dhaskartha. He was the one who acknowledged that any number divided by zero is infinity & that the sum of any number & infinity is also infinity. "Gidhanta Dhanam" was written by him. 		

Date: 23rd Dec 2017

Mathematical achievements.

- * In mathematics, there is a distinction between having an insight and having a proof.
- * Ramanujan's talent suggested a group of formulae that could then be investigated in depth later.
- * It is said that Ramanujan's discoveries are unusually rich. As a by-product, new directions of research were opened up.

Some other Contributions:

- * Apart from the contributions mentioned above, he worked in some other areas of mathematics such as hypergeometric series, Bernoulli numbers, Fermat's last theorem.
- * He focused mainly on developing the relationship between partial sums and products of hypergeometric series.

- * He independently discovered Bernoulli numbers and using these numbers he formulated the value of Euler's constant up to 15 decimal places.
- * He nearly verified Fermat's last theorem which states that no three natural numbers x, y, z satisfy the equations

$$x^n + y^n = z^n$$

Theory of Equations:

Ramanujan was shown how to solve cubic equations in 1902 and he went on to find his own method to solve the quadratic. He derived the formula to solve the biquadratic equations. The following year, he tried to provide the formula for solving quintic but he couldn't as he was not aware of the fact that quintic could not be solved by radicals.

Ramanujan-Hardy Asymptotic Formula:

Ramanujan's one of the major works was in the partition of numbers. In a joint paper with Hardy, Ramanujan gave an asymptotic formula for $P(n)$. In fact a careful analysis of the generating function for $P(n)$ leads to the Hardy-Ramanujan asymptotic formula given by -

$$P(n) \sim \frac{1}{4n\sqrt{3}} e^{\pi\sqrt{\frac{2n}{3}}}, \quad n \rightarrow \infty$$

Ramanujan's Congruences

Ramanujan's Congruences are some remarkable congruences for the partition function. He discovered the congruences:

$$P(5n+4) \equiv 0 \pmod{5}$$

$$P(7n+5) \equiv 0 \pmod{7}$$

$$P(11n+6) \equiv 0 \pmod{11}, \quad \forall n \in \mathbb{N}$$

Highly Composite Numbers.

A natural number n is said to be highly composite number if it has more divisors than any smaller natural number. If we denote the number of divisors of n by $d(n)$ then we say $n \in \mathbb{N}$ is called a highly composite number if $d(m) < d(n), \forall m < n$, where $m \in \mathbb{N}$.

* Infinite Series for π

Srinivasa Ramanujan also discovered some remarkable infinite series of π around 1910. The series.

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k+1)(1103 + 26390k)}{(k!)^4 396^{4k}}$$

Computes a further eight decimal places of π with each term in the series. Later on, a number of efficient algorithms have been developed by number theorists using the infinite series of π given by Ramanujan.

* Hardy - Ramanujan Number:

Once Hardy visited to putney where Ramanujan was hospitalized. He visited there in a taxi cab having number 1729. Hardy was very Superstitious due to his Superstitious nature when he entered into Ramanujan's room he quoted that he had just come in a taxi cab having number 1729 which

seemed to him an unlucky number, but at that time Ramanujan promptly replied that this was a very interesting number as it is the smallest number which can be expressed as the sum of cubes of two numbers in two different ways as given below:

$$1729 = 1^3 + 12^3 = 10^3 + 9^3$$

Later some theorems were established in theory of elliptic curves which involves this fascinating number.

* Goldbach's Conjecture

Goldbach's Conjecture is one of the important illustrations of Ramanujan's contributions towards the proof of the conjecture. The statement is every even integer than 2 is the sum of two primes, that is $6 = 3 + 3$. Ramanujan and his associates had shown that every large integer could be written as the sum of at most four.

SRINIVASA RAMANUJAN

- Name :- Ruchika Rajendra Jawale
- College :- Sant Gadge Maharaj Mahavidyalaya, Hingna
- Class :- Bsc 2nd year (PCM)
- Subject (Topics) :- Mathematical Contributions of Srinivasa Ramanujan.

SREENIVASA IYENGAR RAMANUJAN

- * Born on 22 December 1887 into a Tamil Brahmin Iyengar family in Erode, Madras Presidency (now Tamil Nadu) at the residence of his maternal grandparents.
- * Indian Mathematician and autodidact lived during the British Raj.
- * Substantial contributions to mathematical analysis, number theory, infinite series, and continued fractions including solutions to mathematical problems considered to be unsolvable.
- * Academic advisors were G. H. Hardy and J. E. Littlewood.

NATIONAL MATHEMATICS DAY

22nd DEC

Birth Anniversary of Great Indian Mathematician.

"Srinivasa Ramanujan"

- dishwanaya Suresh Hedao.



Topic: Contibution of Indian Mathematicians in Mathematical Sciences

Rahul H. Bagde
rahulbagde200@gmail.com

- MATHEMATICS has played a significant role in the development of Human Civilization. Emerged in the Indian subcontinent around 1200 BCE, Indian Mathematicians have contributed a Great Deal of Theories and Measures in the Sphere of Mathematics.
- In the classical period of Indian Mathematics (400 CE to 1800 CE), important contributions were made by scholars. And the Legacy Established has been taken forward by others. Here We have Compiled a brief draft of these Legends and their Overwhelming Contributions.

SRINIVASA RAMANUJAN

[1887 -]

"The man who knew the Infinity", Ramanujan made substantial contributions to mathematical analysis, number theory, infinite series and continued fractions. One of the first problems he posed and gave solution to was:

Solve for x
 $x = 1+2 \cdot 1+3 \cdot 1+4 \cdot 2+ \dots$



SATYENDRA NATH BOSE

[1894 - 1983]

Known for his collaboration with Albert Einstein, Satyendra Nath Bose established modern theoretical physics in India. Bose made significant advances in statistical mechanics and quantum statistics.



ARYABHATA-I

[476 CE - 550 CE]

The first of the Major Mathematicians-Astronomers, Aryabhata I calculated the Value of Mathematical Constant π (pi) at 3.1416, correct to four decimal places. Invents of Aryabhata also gave us the place value system, circumference of Earth to 99.8% accuracy, calculation of the length of sidereal year.



C R RAO

[1907 - 1996]

Chakravarti Raghunathra Rao, is a well-known statistician, famous for his "theory of estimation." His contributions to statistical theory and applications are well known, and many of his results, which bear his name, are included in the curriculum of courses in Statistics at bachelor's and Master's level all over the world.



PRASANTA CHANDRA MAHALANOBIS

[1893 - 1972]

"FATHER OF INDIAN STATISTICS" Remembered for the Mahalanobis Distance. He is also known for being One of the Members of the First Planning Commission of Free India.



HARISH CHANDRA

[1923 - 1983]

Harish-Chandra, born in Kanpur, Uttar Pradesh, was an Indian American mathematician and Physicist who did Fundamental Work in Representation theory, especially Harmonic Analysis on Semi-Simple Lie groups. Representation theory is a useful Branch of Mathematics that reduces problems in Abstract Algebra to the problems of Linear Algebra.



D R KAPREKAR

[1905 - 1986]

Dattaraya Ramchandra Kaprekar was an Indian recreational mathematician who described several classes of natural numbers including the Kaprekar, Harshad and self-numbers and discovered the Kaprekar constant, named after him.



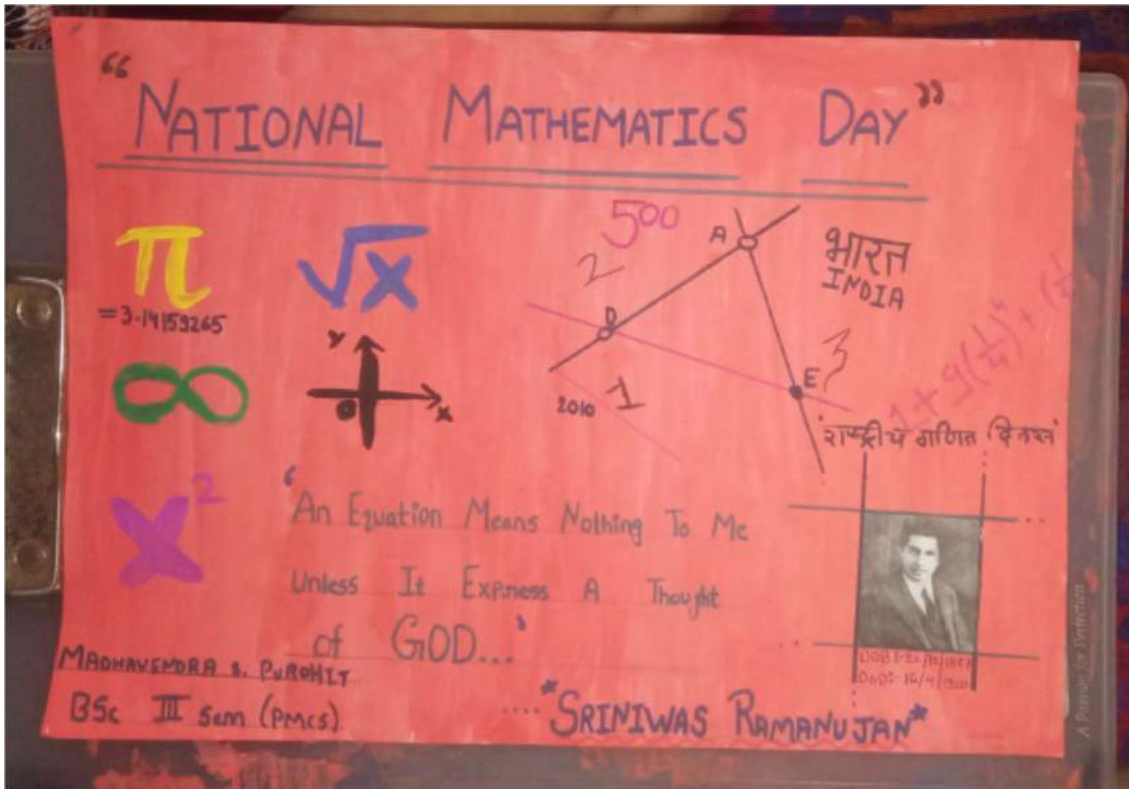
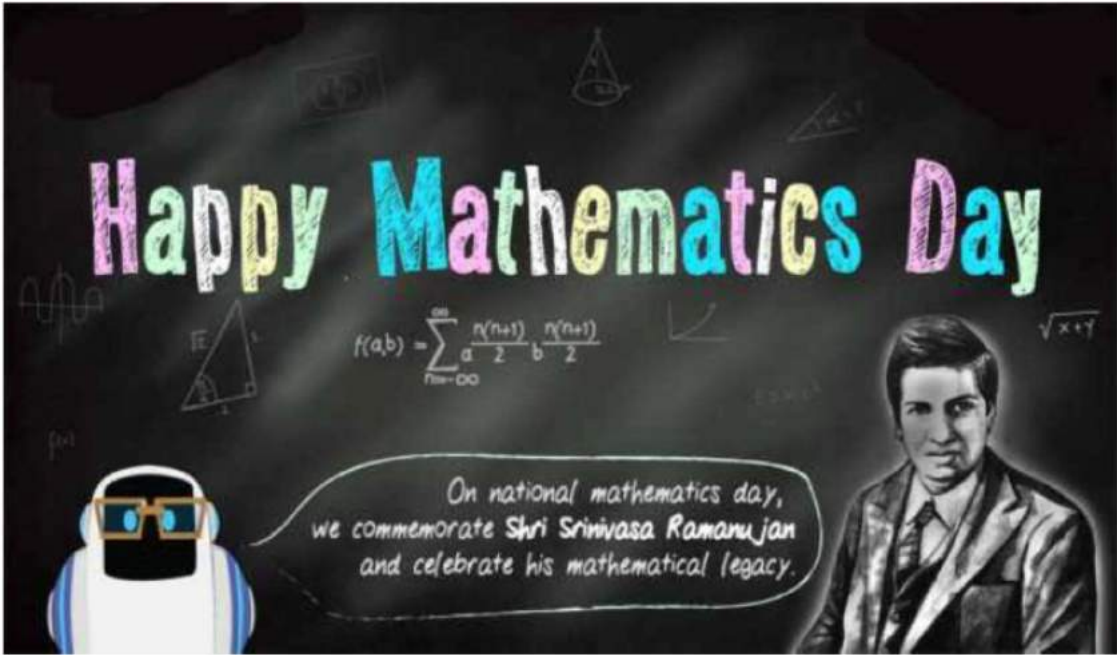
BRAHMAGUPTA

[598 CE - 668 CE]

Without zero we would lack Calculus, financial accounting, the ability to make arithmetic computations quickly and computers. The rules governing the use of zero were first stated in his early work, "Brahmagupta Siddhanta".

His other great works refined the Indian system of counting as the Universal Language and one "The Most Intellectual Systems of All Times."





NATIONAL MATHEMATICS DAY OF INDIA

22nd December,

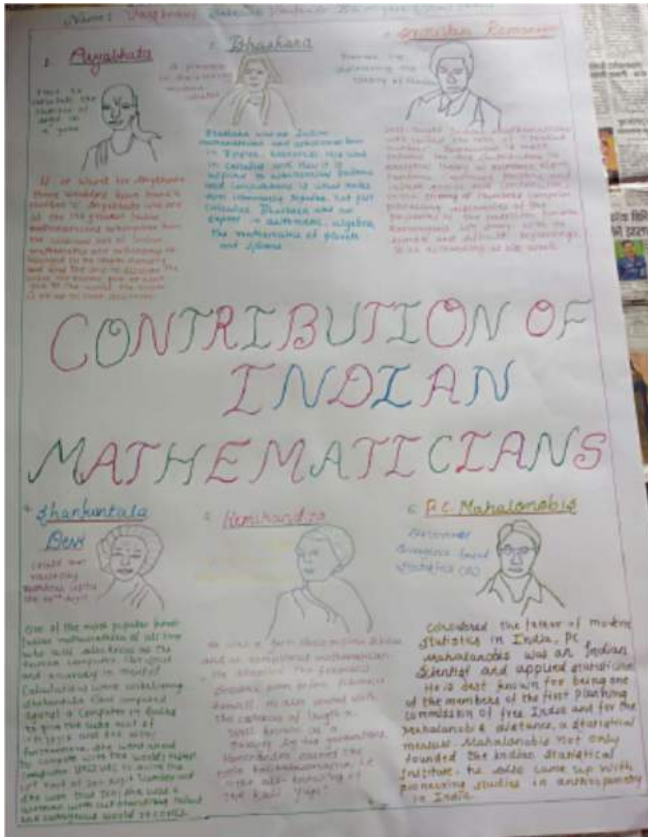
Birthday of
THE GREAT MATHEMATICIAN
"Srinivasa Ramanujan"



"An equation means nothing to me unless
it expresses a thought of God."

- Srinivasa Ramanujan.

Name :- Kautam Khushal Niwalkar
36 4 + 0 x π ∞ x^2 = 4702.



A total of 119 students from three colleges participated in the Poster Presentation Competition. Certificates were distributed to all the student participants of all the colleges.

The Certificate for the Poster competition is attached below



The program ended with a vote of thanks given by Dr Rajani Anturkar, Head, Department of Mathematics, Sant Gadge Baba College, Hingna, Nagpur.