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

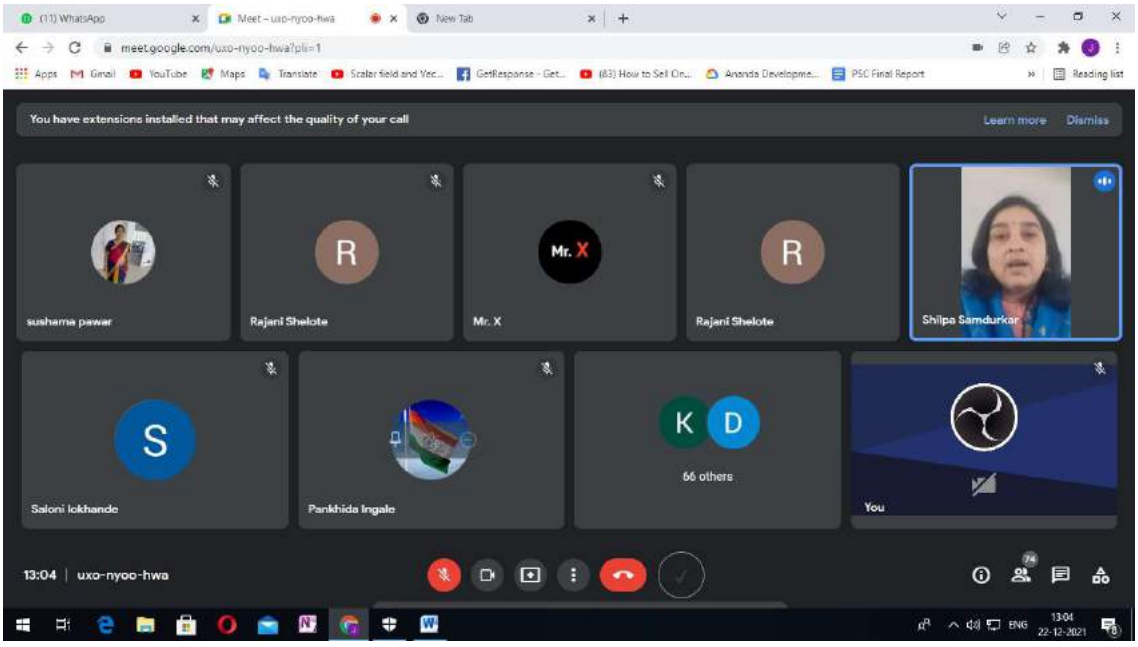
# REPORT

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:



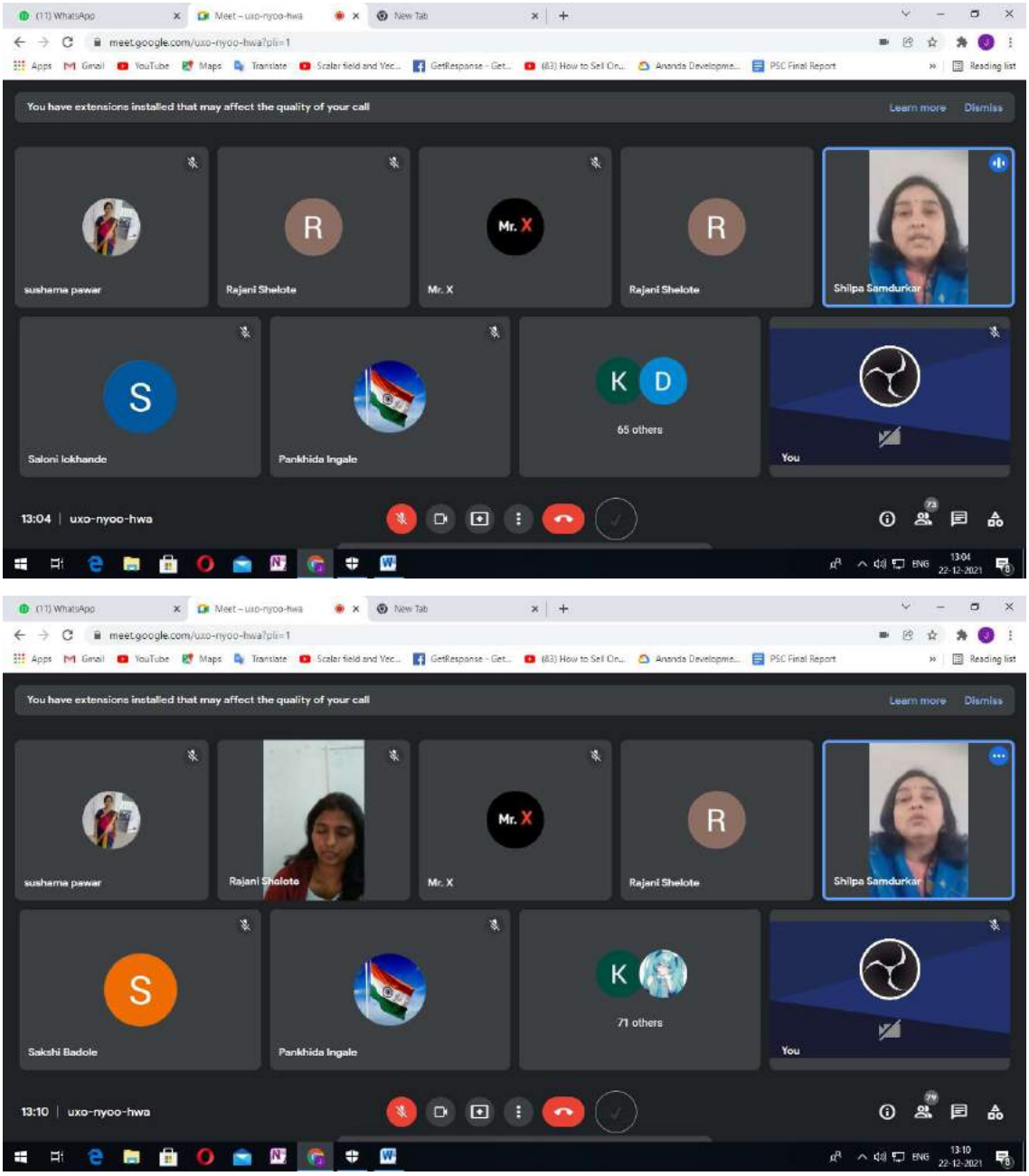



Fig: Agenda of the Guest Lecture

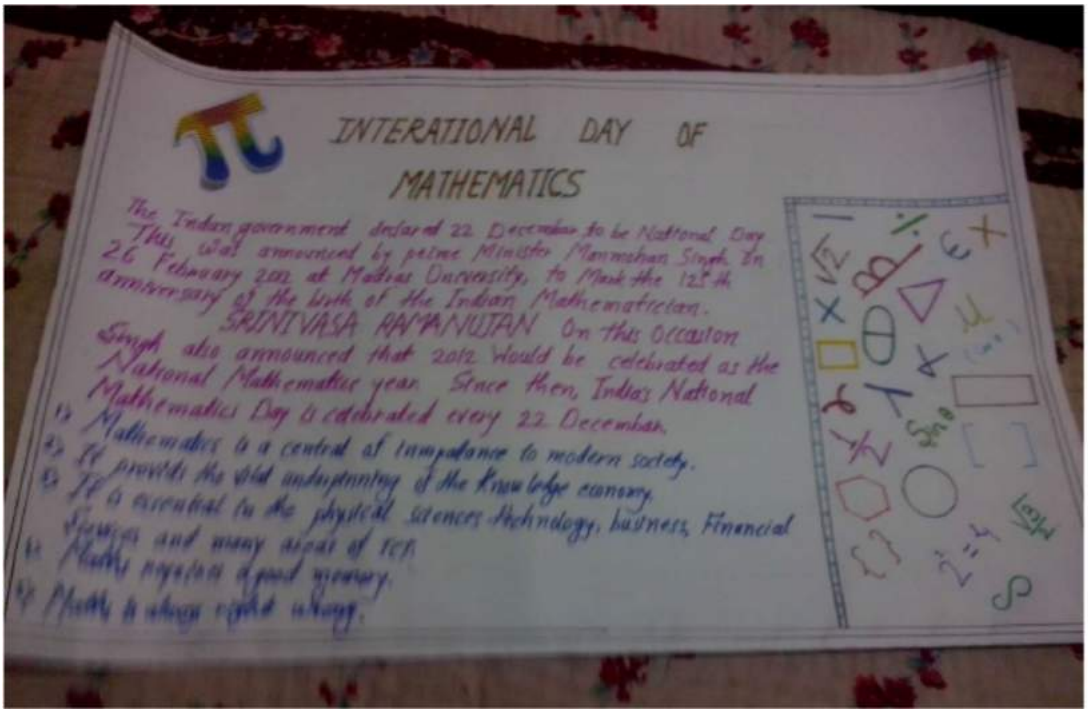
After the conclusion of the final session a formal vote of thanks was given by Dr. Jitesh Tripathi, Assistant Professor, Department of Mathematics, Dr. Ambedkar College, Nagpur. He declared that webinar has been successfully carried out with its main theme and imparted knowledge about the National Mathematics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

**Ramanujan's Life and Passion**

Born on December 22, 1887 in Pallipalayam grew up in Kumbakonam Tamil Nadu.

At the age of 12, he was declared "CHILD MATHEMATICIAN" by his teachers.

His findings came as visions from his hometown goddess "Namagiri" 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.

First problem which Posed $\sqrt{1+2\sqrt{1+3\sqrt{1+\cdots}}}$

He then formulated an equation to solve the infinitely nested radicals $x+n+a=\sqrt{ax+n(x+n+a)+(x+n+a)\sqrt{\cdots}}$

Wrote his 1st formal paper for the journal on properties of Bernoulli Numbers.

Instantly Ramanujan claimed that it was Smallest natural number which can be written as Sum of cubes in 2 ways $1729 = 1^3+12^3 = 9^3+10^3$

Apart from the contribution mentioned above, he worked in some other areas of mathematics such as hypo geometrics series, Bernoulli number, 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

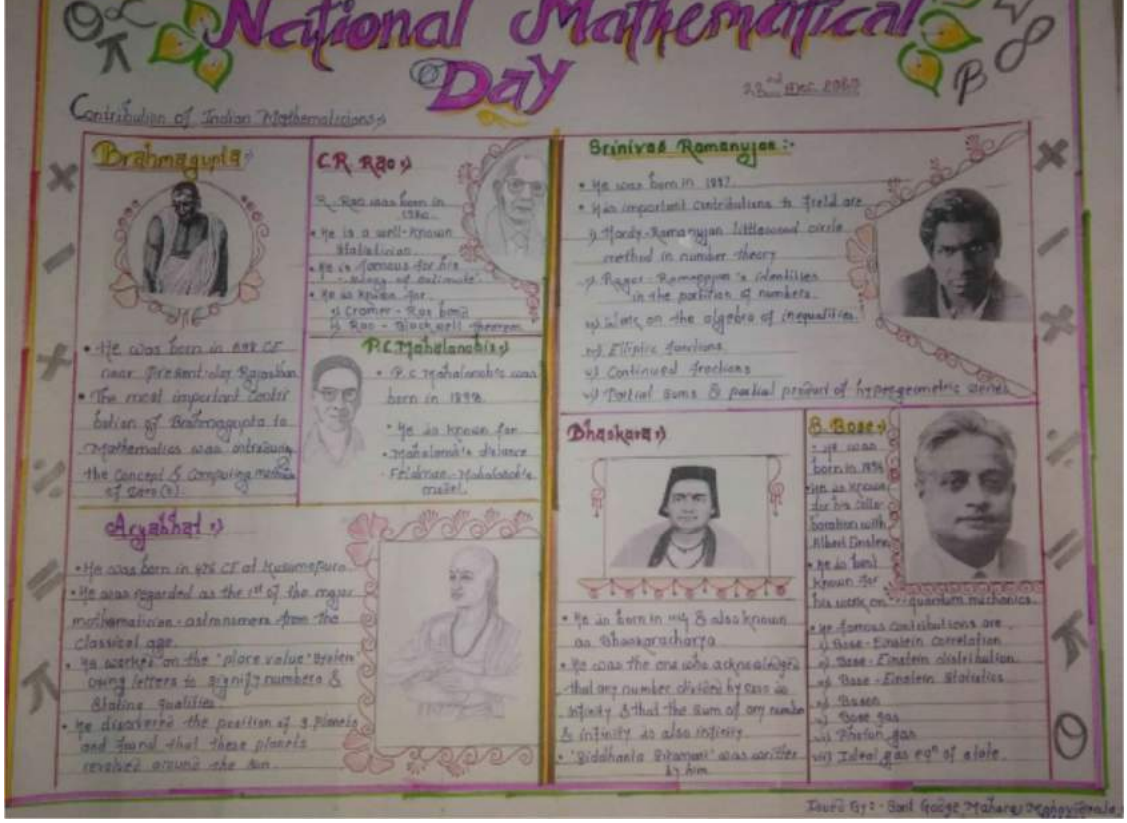
He nearly verified Fermat's last theorem which states that no three natural numbers $x, y, z$ satisfy

**Ramanujan's Honours**

Awarded BA degree by research (later 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.



## 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 hypo geometric Series, Bernoulli numbers, Fermat's last theorem.
* He focused mainly on developing the relationship between partial Sums and Products of hyper geometric 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 their natural numbers $x, y, z$ Satisfy the equations

— X — X — X —

## * 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 years, 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 formulas for $P(n)$. In fact a careful analysis of the generating function for $P(n)$ leads to the Hardy - Ramanujan asymptotic formula given by -

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

## * Ramanujan's Congruences

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

$$p(5n+4) \equiv 0 \pmod 5$$
$$p(7n+5) \equiv 0 \pmod 7$$
$$p(11n+6) \equiv 0 \pmod{11}, \forall\, n \in \mathbb{N}$$

## * Highly Composite Numbers.

A natural number $n$ is said to be highly composite numbers 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 $d(m) < d(n), \forall\, m < n$, where $m \in \mathbb{N}$.

## Infinite Series for π

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

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

Computes a futther 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 were Ramanujan was hospitalized. He visited there in a taxi cab having number 1729. Hardy was very Superstitious due to his Such nature when he entered into Ramanujan's room he quoted that he had just Came 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 gen 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

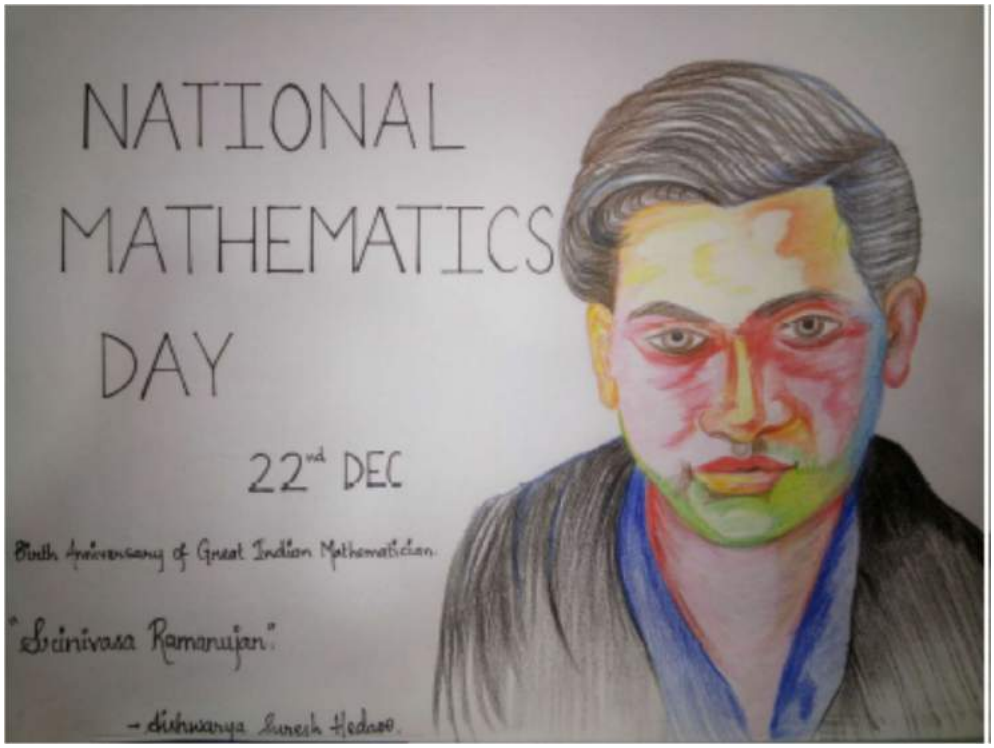
Goldbach's Conjecture is one of the important illustrations of Ramanujan Contributions towards the Proof of the Conjecture. The statement is every even integer than 2 is the Sum of two primes, that is $6 = 3+3$. Ramanujan and his associates had shown that every large integer could be written as the Sum 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

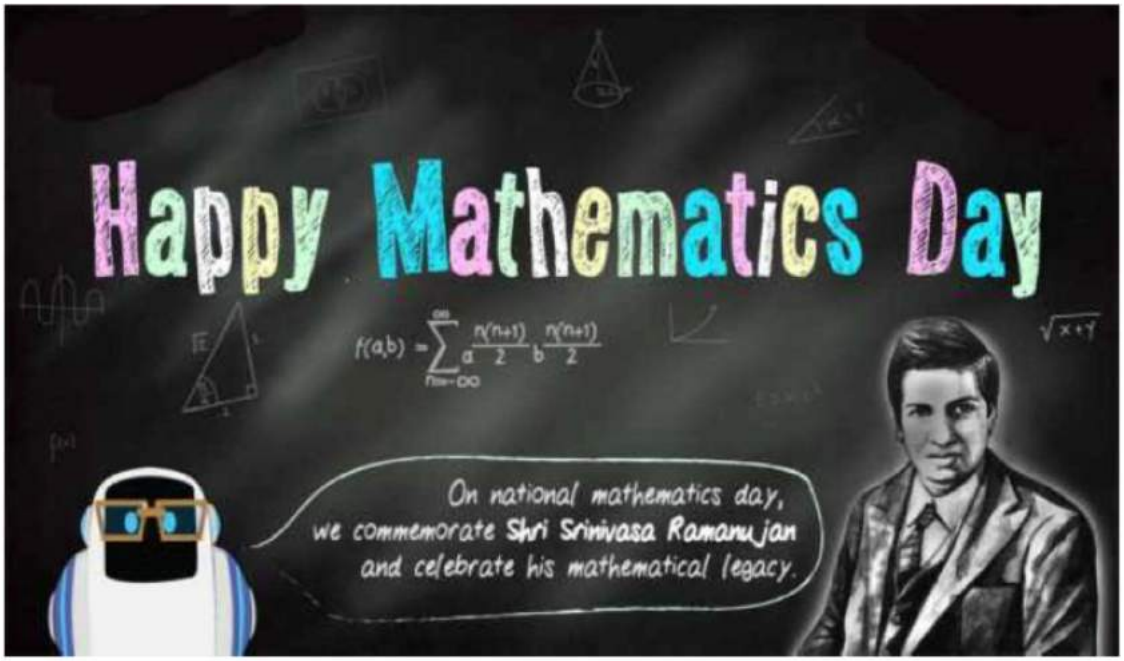
* Born on 22 December 1887 into a tamil Brahmin Iyengar Family in Erode, Madras Presidency (now Tamil Nadu) at the residence of his maternal grandparents.
* Indian Mathematician and autoclidact lived during the British Raj.
* Substantial Contributions to mathematical analysis, number theory, infinite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

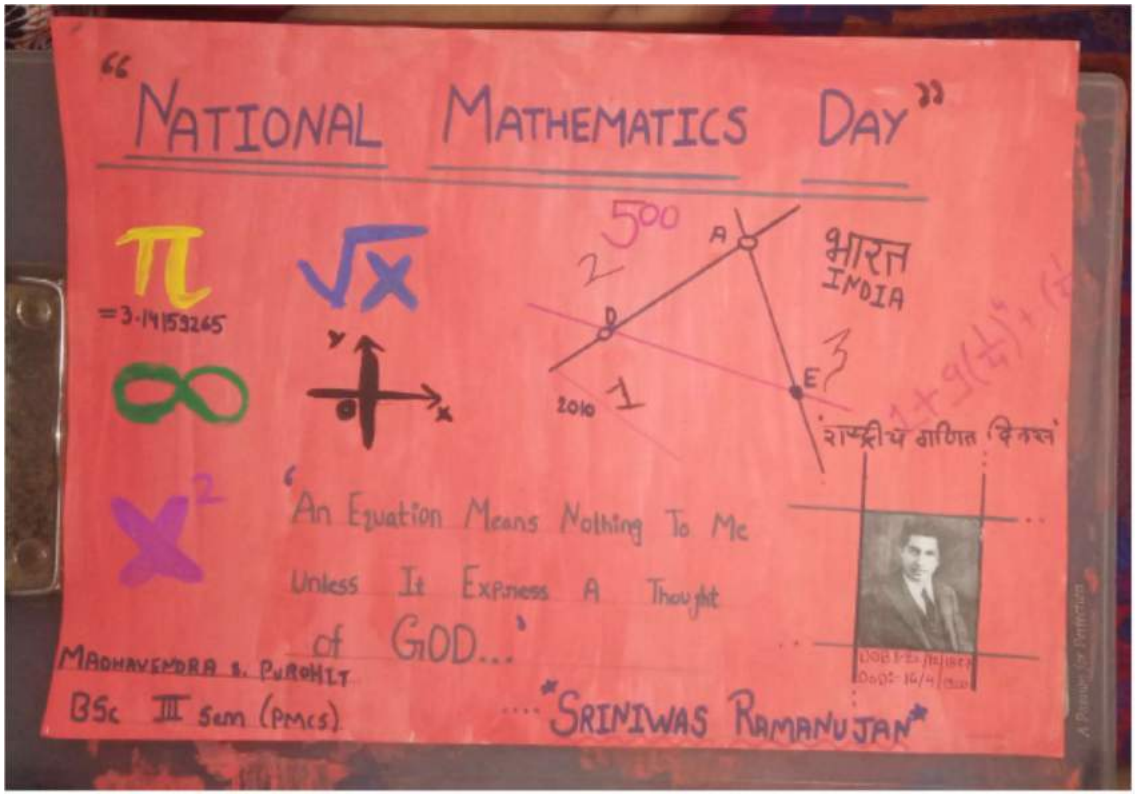


# Topic:- Contibution of Indian Mathematicians in Mathematical Sciences

Rahul H. Bagde
rahulbagde1994@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 1600 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.


Happy Mathematics Day
$f(a,b) = \sum_{n=-\infty}^{\infty} a^{\frac{n(n+1)}{2}} b^{\frac{n(n+1)}{2}}$
On national mathematics day, we commemorate Shri Srinivasa Ramanujan and celebrate his mathematical legacy.


"NATIONAL MATHEMATICS DAY"
$\pi$
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$\sqrt{x}$
$\infty$
$x^2$
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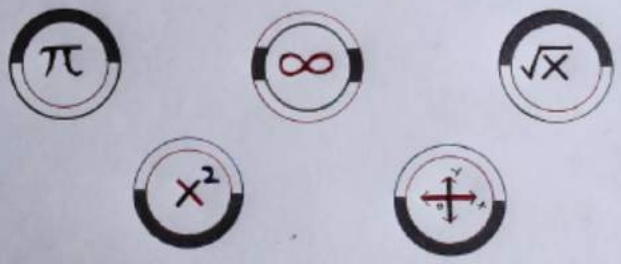
2010
भारत
INDIA
'राष्ट्रीय गणित दिवस'
'An Equation Means Nothing To Me Unless It Expiness A Thought of GOD...'
MADHAVENDRA S. PUROHIT
BSc III Sem (PMCs)
...SRINIWAS RAMANUJAN

NATIONAL MATHEMATICS DAY OF INDIA

22nd Decembes

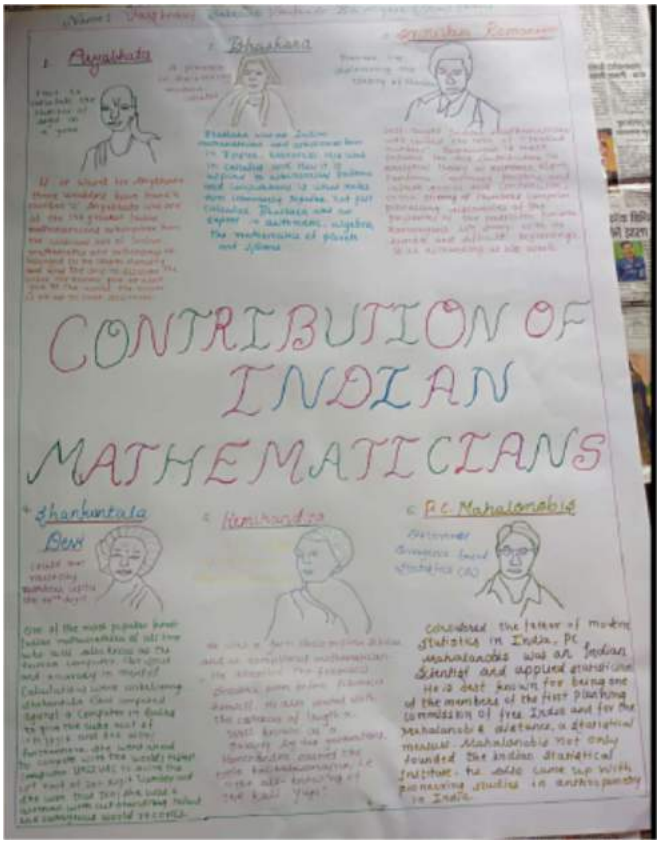
Bisthday of
THE GREAT MATHEMATICIAN
"Srinivasa Ramanujan"




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

- Srinivasa Ramanujan.

Name :- Kautam Khushal Niwalkas,




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

Sant Gadge Maharaj Mahavidyalaya, Hingna Dist. Nagpur
In Collaboration with
Dr. Ambedkar College, Deekshabhoomi, Nagpur

Certificate Of Participation

This is to certify that
{{Full Name}}

{{Other Identifier}}

has actively participated in the Intercollegiate e-poster Making Competition on the occasion of National Mathematics Day Celebrations-2021 held on December 22, 2021 organized by the Department of Mathematics, Sant Gadge Maharaj Mahavidyalaya, Hingna, Dist. Nagpur, India in collaboration with Dr. Ambedkar College, Deekshabhoomi, Nagpur.

| Dr. Arti Moglewar | Dr. Mrs. B. A. Mehere | Dr. Ganesh Maywade | Prof. S. M. Pawar | Dr. Rajani Anturkar | Dr. Jitesh Tripathi |
|---|---|---|---|---|---|
| Principle SGMM, Hingna | Principle Dr. Ambedkar College, Nagpur | IQAC Coordinator SGMM, Hingna | Coordinator Dr. Ambedkar College, Nagpur | Convenor NMD-2021 | Convenor NMD-2021 |

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