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National Mathematics Day (December 22)

Celebrating the Birth Anniversary of the Great Mathematician Srinivasa Ramanujan

(Ministry of Science and Technology)

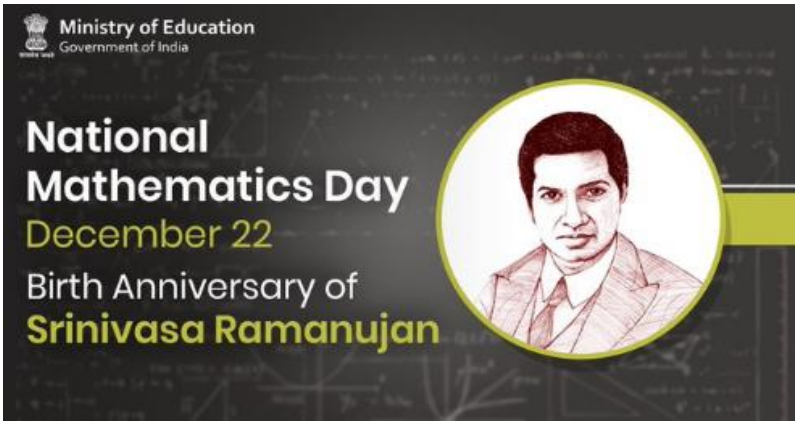
December 22, 2022

"Mathematics is such a subject about which we Indians should be most comfortable. After all, the people of India have given the most research and contribution to the whole world regarding mathematics."

- Prime Minister Narendra Modi

INTRODUCTION

Mathematics in India has a very rich, long and hallowed history. Starting from the most elementary thing in mathematics namely the representation of numbers, through the way of expressing recursive relations, to arriving at the solutions of indeterminate equations, to the development of sophisticated techniques in handling the infinite and the infinitesimals, Indian mathematicians have made remarkable contributions.[1]



India's contribution to mathematics, spanning from 1200 BCE to 1800 BCE is well known. The decimal number system, concept of zero and negative numbers were its gifts in addition to its inputs into the fields of arithmetic, algebra and trigonometry. Its classical, as well as golden period, ranged from fourth to sixteenth century, having contributions come from great scholars like Āryabhaṭa, Varāhamihira, Brahmagupta and Bhāskara II. [2]

To see the glimpses of journey of Ancient Indian Mathematics, **Click Here**.

[1] Press Information Bureau (pib.gov.in)
[2] https://namami.gov.in/sites/default/files/book_pdf/History%20and%20Development%20of%20Mathematics%20in%20India.pdf

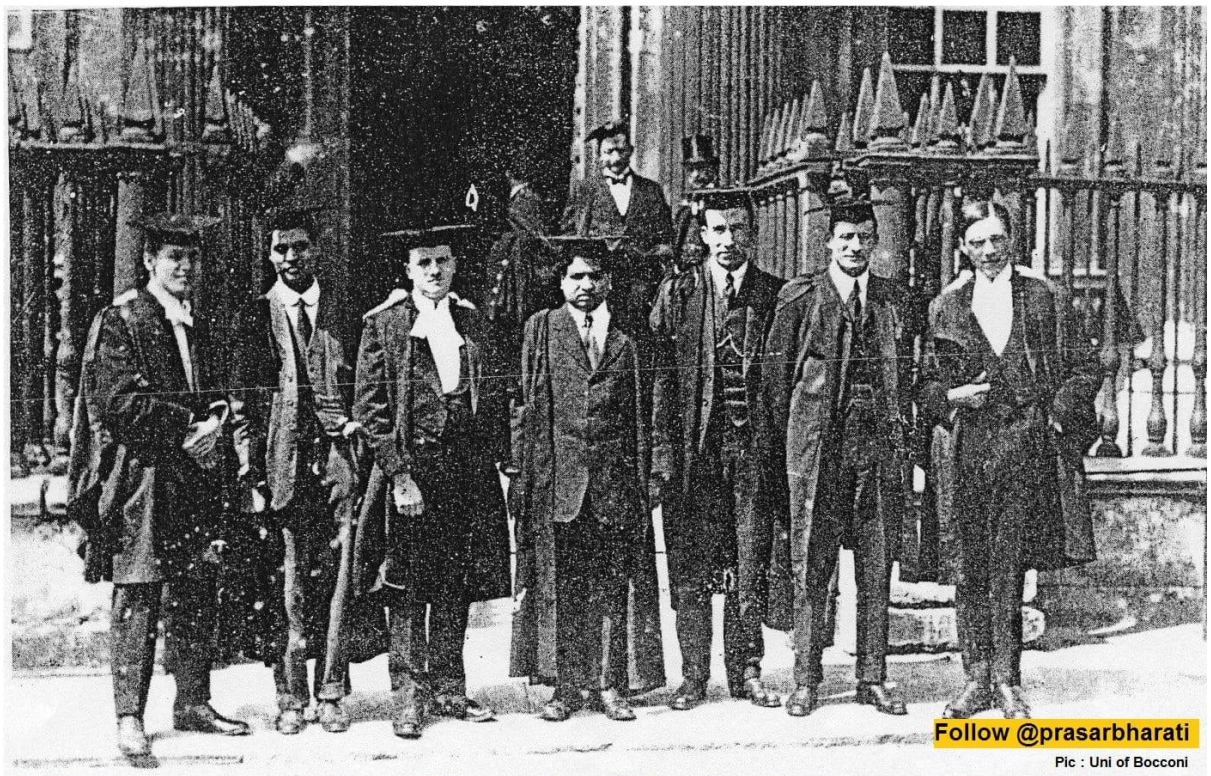
NATIONAL MATHEMATICS DAY: TRIBUTE TO LEGENDARY INDIAN MATHEMATICIAN

December 22, the birth anniversary of the great mathematician Srinivasa Ramanujan was designated as "National Mathematics Day (NMD)" by the Government of India in December 2011. For the first time, the year 2012 was celebrated as the **National Mathematics Year** across the country.

This day is celebrated to mark the birth anniversary of the Ramanujan and recognise his contribution to the field of mathematics. He gave solutions to mathematical problems which were considered unsolvable at that time. Ramunajan's ground-breaking work in the field of mathematics is an inspiration for mathematicians across the world, and his work has inspired extensive research over the years.[3]

SRINIVASA RAMANUJAN: THE MEN WHO KNEW INFINITY

Ramanujan is remembered for his contributions to mathematical analysis, infinite series, continued fractions and number theory. He also discovered his own theorems and compiled as many as 3900 results independently. Ramanujan had a wealth of ideas that transformed and reshaped 20th century mathematics. These ideas still continue to shape mathematics of the 21st century.[4]



The Indian mathematician Srinivasa Ramanujan (centre) together with his colleague Godfrey Harold Hardy (extreme right) and other scientists at Trinity College at the University of Cambridge.

[3] https://newsonair.com/2021/12/22/national-mathematics-day-the-man-who-knew-infinity-srinivasa-ramanujan/
[4] https://www.indiascienceandtechnology.gov.in/listingpage/india-celebrating-national-mathematics-day

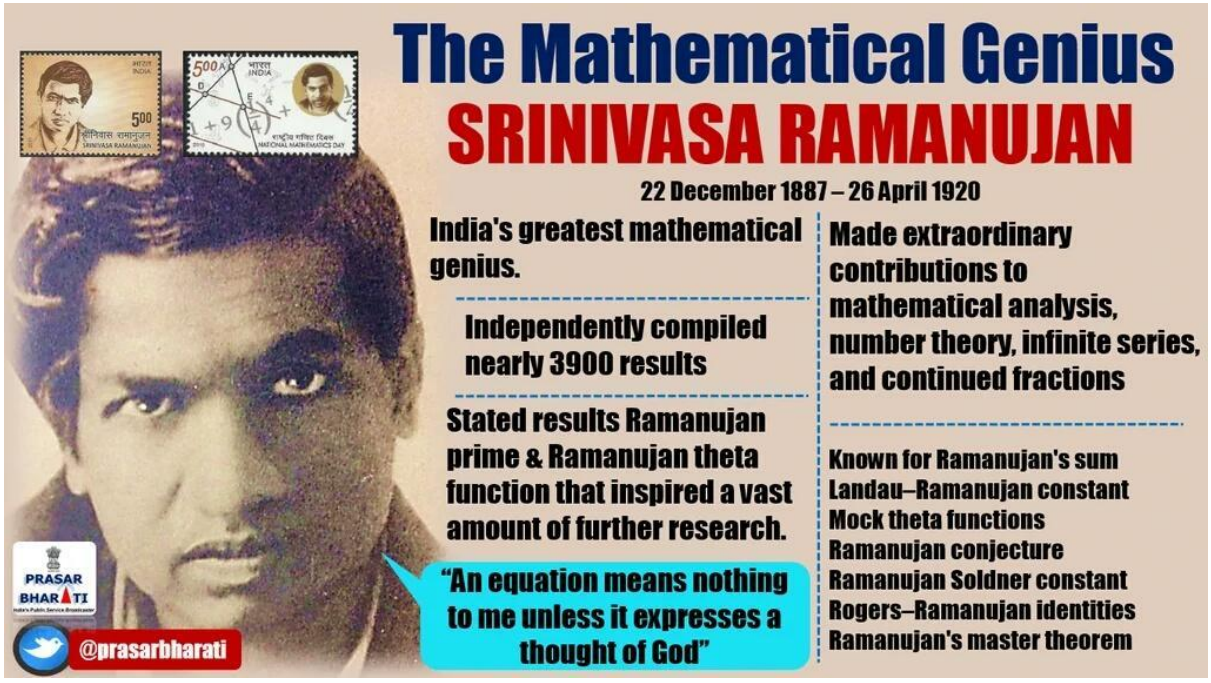
He was born on December 22, 1887, in Erode, Tamil Nadu. He emerged from extreme poverty and began his journey to become one of the most influential mathematicians of all times. His mathematical identities and theorems opened up new possibilities and contributed immensely to the frontier areas of mathematics. Much of Ramanujan's mathematics falls in the domain of number theory — the purest realm of mathematics. To know more about Srinivasa Ramanujan, **click here**. [5]

Ramanujan's Major Contributions to Mathematics[6]

- **Infinite series for pi:** In 1914, Ramanujan found a formula for infinite series for pi, which forms the basis of many algorithms used today. Finding an accurate approximation of π (pi) has been one of the most important challenges in the history of mathematics.

- **Game Theory:** Ramanujan discovered a long list of new ideas for solving many challenging mathematical problems that have given great impetus to the development of game theory. His contribution to game theory is purely based on intuition and natural talent and is unmatched to this day.

- **Mock Theta Function:** He elaborated on the mock theta function, a concept in the field of modular forms of mathematics.



- **Ramanujan Number: 1729** is known as the Ramanujan number which is the sum of the cubes of two numbers 10 and 9.

- **Circle Method:** Ramanujan, along with GH Hardy, invented the circle method which gave the first approximations of the partition of numbers beyond 200.

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[5] https://ddnews.gov.in/national/national-mathematics-day-being-celebrated-today
[6] Ramanujan: The Man Who Knew Infinity | India Science, Technology & Innovation - ISTI Portal (indiascienceandtechnology.gov.in)

- **Theta Function:** Ramanujan theta function is used to determine the critical dimensions in Bosonic string theory, superstring theory, and M-theory.

- Other notable contributions by Ramanujan include the hyper-geometric series, the Riemann series, the elliptic integrals, the theory of divergent series, and the functional equations of the zeta function.

ACKNOWLEDGING THE CONTRIBUTORS TO THE FIELD OF MATHEMATICS

- National Mathematics Day is celebrated at schools, Colleges, Universities and Educational Institutions in India. Various competitions, debate, mathematical quizzes, seminars, workshops, lectures and, exhibitions are organized on this occasion.[7]

Celebrating National Mathematics and National Science Day-2020 at Govt. Chhattisgarh College, Raipur


Students Participating in Various Competitions

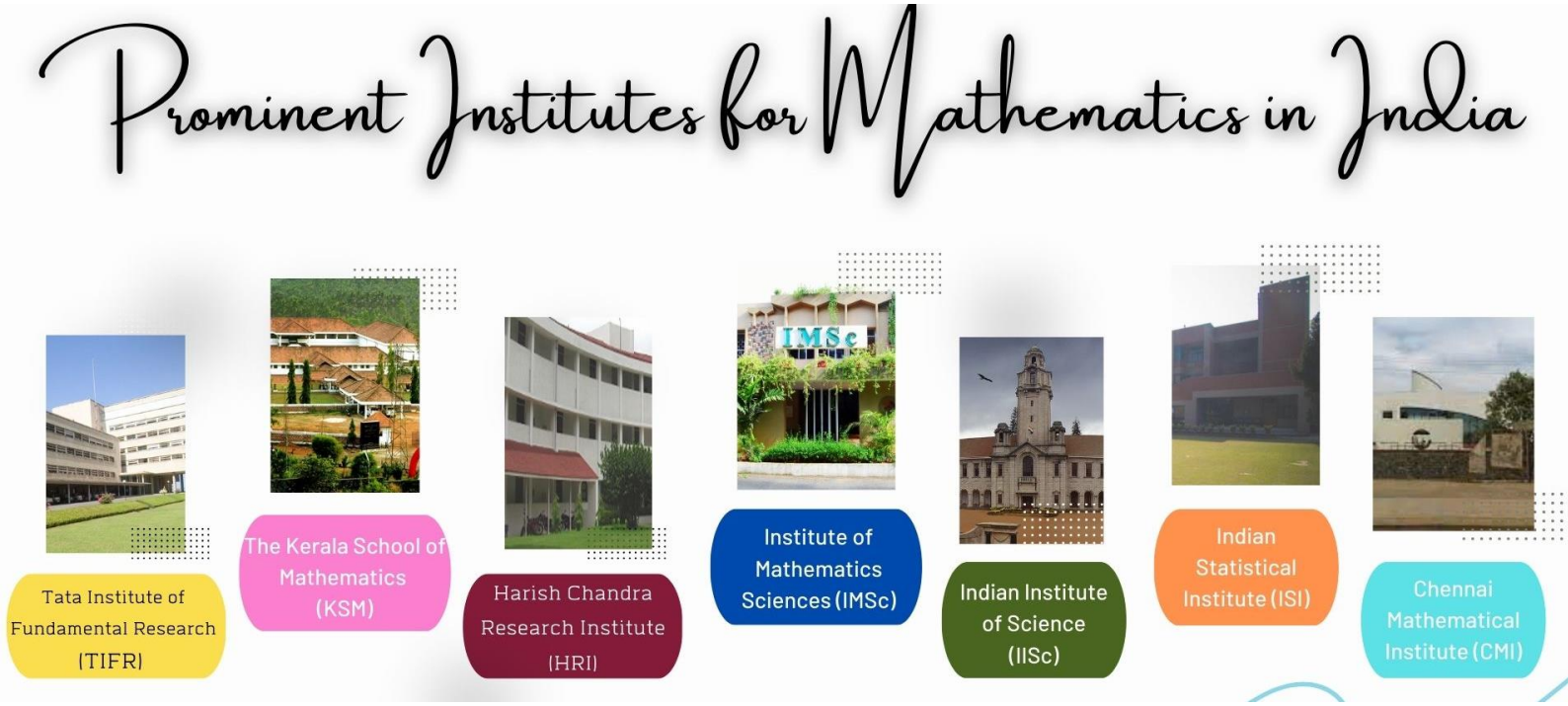
- UNESCO (The United Nations Educational, Scientific and Cultural Organization) and India agreed to work together for spreading the joy of learning and understanding mathematics. They also took various steps to educate students on Mathematics and spread the knowledge to students and learners across the world. Also, Conferences on the "Zero" at UNESCO Headquarters in Paris, as well as at the Indian Institute of Science, Bangalore have been held, bringing together academics, mathematicians and teachers to explore and discuss key associated concepts. [8]

- The **Ramanujan Prize** is awarded annually to a researcher from a developing country funded by the Department of Science and Technology (DST) of the Government of India in association with ICTP (International Centre for Theoretical Physics) and the International Mathematical Union (IMU). It is given to young mathematicians less than 45 years of age who have conducted outstanding research in a developing country. The Ramanujan Prize for Young Mathematicians was awarded to Professor Neena Gupta, a

[7] TSCOST - NMD-2019_Web file.pdf (telangana.gov.in)
[8] https://pib.gov.in/newsite/PrintRelease.aspx?relid=133695

mathematician of the Indian Statistical Institute in Kolkata, in a virtual ceremony on February 22, 2022.[9]

- The **Fields Medal** is awarded every four years on the occasion of the International Congress of Mathematicians to recognize outstanding mathematical achievement for existing work and for the promise of future achievement. American mathematician of Indian origin[10], Manjul Bhargava, received the Fields Medal in 2014 for the work based both on a deep understanding of the representations of arithmetic groups and a unique blend of algebraic and analytic expertise.[11]



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[9] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1800354
[10] https://pib.gov.in/newsite/PrintRelease.aspx?relid=224973
[11] https://www.mathunion.org/imu-awards/fields-medal/fields-medal-2014/fields-medallists-2014-awardees-brief-citations

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