

DECEMBER 22: NATIONAL MATHEMATICS DAY

THE MATHEMATICS GENIUS

What will be the result if zero is divided by zero? This was the question asked by a student in the class. The question left the teacher in the class puzzled and students laughing. But this question paved the way for solving the most difficult puzzle of the mathematics; the answer to which the whole world was searching till then. The student who asked the question was Srinivasa Ramanujan, whose mathematical principles are being still researched by scholars.



BORN: 22 DECEMBER 1887 | DIED: 26 APRIL 1920

This incident narrated by Prime Minister Narendra Modi in a programme in Ahmedabad speaks volumes about the genius of Ramanujan, a mathematician whose mettle was recognized by the whole world. Hailing from a small town of Erode in Tamil Nadu, Ramanujan challenged every theory prevailing in the mathematical world then and introduced the legacy of Indian mathematical concepts to the whole world. His father Srinivasa Iyengar was an accountant with a cloth merchant. Ramanujan was a child of sharp intelligence since childhood. He passed his tenth examination from Madras University in 1903 and was given many awards for his academic accomplishments. In the same year, he discovered the formula for solving the cube and biquadratic equations. With the passage of time, Ramanujan's inclination towards mathematics became stronger and as a result, he failed in all other subjects except mathematics in the 12th examination. Later he enrolled himself in a college in Madras. But here too, except mathematics, Ramanujan's performance in other subjects remained disappointing. Ramanujan was married during the same period after which marital responsibilities also fell upon him. On the recommendation of his former teacher Professor Seshu Iyer, he met the then Collector of Nellore R. Ramachandra Rao who was also the President of the Indian Mathematical Society. After going through Ramanujan's notebook – in which he had written the sutras and theorems and proved them himself – R. Ramachandra Rao, fixed his remuneration at Rs 25. During this period Ramanujan worked on preparing questions and their solutions for the Journal of the Indian Mathematical Society. He gained much fame with the research paper presented in 1911 on Bernoulli Numbers. In 1912 with the help of

R. Ramachandra Rao, he got a job as a clerk in the Accounts Department of the Madras Port Trust. His life transformed in 1913 after he wrote a 10-page letter to the famous English mathematician Prof GH Hardy. At first sight, this letter to Hardy seemed to be lacking credibility. But when he examined it carefully, many of these theorems were beyond his imagination. Hardy, along with his colleague JE Littlewood, thoroughly reviewed Ramanujan's work. Hardy invited Ramanujan to visit Cambridge. Ramanujan was heavily superstitious about crossing the sea. Also, his mother was staunchly opposed to him sailing to a foreign land. Ramanujan persuaded his mother after which he went to the university. Upon his arrival at Cambridge, Ramanujan began work with Littlewood and Hardy. Ramanujan had already sent 120 theorems to Hardy.

In March 1916 Ramanujan was awarded a BA degree by Cambridge University in recognition of his mathematical works. Between 1915 and 1918, he wrote several research papers. On December 6, 1917, Ramanujan was elected a Fellow of the "Royal Society of London" due to the efforts of Hardy. Ramanujan returned to India in 1919 as a national hero. He was at the pinnacle of his career but his health was failing. He had TB. He wrote the last letter to Hardy on January 12, 1920, in which he talked about the mock theta function. Till then this mysterious theory was not even thought of. Before Hardy could answer, he received news that Ramanujan was no more. He died on April 26, 1920 at the age of only 32 years.

To what extent Ramanujan's sutras extend, we still do not know. His formulas are in use everywhere today, from signal processing to black hole physics. The world understood in the 21st century that the mock theta function is necessary to understand black holes. ■