= Srinivasa Ramanujan =

Srinivasa Ramanujan FRS (pronunciation : / ?ri?niv??s? r??m??n?d??n /) (22 December 1887 ? 26 April 1920) was an Indian mathematician and autodidact . Though he had almost no formal training in pure mathematics , he made extraordinary contributions to mathematical analysis , number theory , infinite series , and continued fractions . Ramanujan initially developed his own mathematical research in isolation ; it was quickly recognized by Indian mathematicians . When his skills became obvious and known to the wider mathematical community , centered in Europe at the time , he began a famous partnership with the English mathematician G. H. Hardy . The Cambridge professor realized that Ramanujan had rediscovered previously known theorems in addition to producing new ones .

During his short life , Ramanujan independently compiled nearly 3 @,@ 900 results (mostly identities and equations) . Nearly all his claims have now been proven correct , although some were already known . His original and highly unconventional results , such as the Ramanujan prime and the Ramanujan theta function , have inspired a vast amount of further research . The Ramanujan Journal , an international publication , was launched to publish work in all areas of mathematics influenced by his work .

Of notably deep religious conviction , Ramanujan credited his substantial mathematical capacities to divinity : ' " An equation for me has no meaning , " he once said , " unless it expresses a thought of God . " '

= = Early life = =

Ramanujan was born on 22 December 1887 into a Tamil Brahmin family in Erode , Madras Presidency (now Tamil Nadu) , at the residence of his maternal grandparents . His father , K. Srinivasa Iyengar , worked as a clerk in a sari shop and hailed from Thanjavur district . His mother , Komalatammal , was a housewife and also sang at a local temple . They lived in Sarangapani Street in a traditional home in the town of Kumbakonam . The family home is now a museum . When Ramanujan was a year and a half old , his mother gave birth to a son , Sadagopan , who died less than three months later . In December 1889 , Ramanujan contracted smallpox , but unlike the thousands in the Thanjavur district who died of the disease that year , he recovered . He moved with his mother to her parents ' house in Kanchipuram , near Madras (now Chennai) . In 1891 and 1894 , his mother gave birth to two more children , but both died in infancy .

On 1 October 1892 , Ramanujan was enrolled at the local school . After his maternal grandfather lost his job as a court official in Kanchipuram , Ramanujan and his mother moved back to Kumbakonam and he was enrolled in the Kangayan Primary School . When his paternal grandfather died , he was sent back to his maternal grandparents , then living in Madras . He did not like school in Madras , and tried to avoid attending . His family enlisted a local constable to make sure the boy attended school . Within six months , Ramanujan was back in Kumbakonam .

Since Ramanujan 's father was at work most of the day , his mother took care of the boy as a child . He had a close relationship with her . From her , he learned about tradition and puranas . He learned to sing religious songs , to attend pujas at the temple , and to maintain particular eating habits ? all of which are part of Brahmin culture . At the Kangayan Primary School , Ramanujan performed well . Just before turning 10 , in November 1897 , he passed his primary examinations in English , Tamil , geography and arithmetic with the best scores in the district . That year , Ramanujan entered Town Higher Secondary School , where he encountered formal mathematics for the first time .

By age 11 , he had exhausted the mathematical knowledge of two college students who were lodgers at his home . He was later lent a book by S. L. Loney on advanced trigonometry . He mastered this by the age of 13 while discovering sophisticated theorems on his own . By 14 , he was receiving merit certificates and academic awards that continued throughout his school career , and he assisted the school in the logistics of assigning its 1200 students (each with differing needs) to its 35 @-@ odd teachers . He completed mathematical exams in half the allotted time , and showed

a familiarity with geometry and infinite series . Ramanujan was shown how to solve cubic equations in 1902 ; he developed his own method to solve the quartic . The following year , not knowing that the quintic could not be solved by radicals , he tried to do so .

In 1903 , when he was 16 , Ramanujan obtained from a friend a library copy of a A Synopsis of Elementary Results in Pure and Applied Mathematics , G. S. Carr 's collection of 5 @,@ 000 theorems . Ramanujan reportedly studied the contents of the book in detail . The book is generally acknowledged as a key element in awakening his genius . The next year , Ramanujan independently developed and investigated the Bernoulli numbers and calculated the Euler ? Mascheroni constant up to 15 decimal places . His peers at the time commented that they " rarely understood him " and " stood in respectful awe " of him .

When he graduated from Town Higher Secondary School in 1904 , Ramanujan was awarded the K. Ranganatha Rao prize for mathematics by the school 's headmaster , Krishnaswami Iyer . Iyer introduced Ramanujan as an outstanding student who deserved scores higher than the maximum . He received a scholarship to study at Government Arts College , Kumbakonam , but was so intent on mathematics that he could not focus on any other subjects and failed most of them , losing his scholarship in the process . In August 1905 , Ramanujan ran away from home , heading towards Visakhapatnam , and stayed in Rajahmundry for about a month . He later enrolled at Pachaiyappa 's College in Madras . There he again excelled in mathematics but performed poorly in other subjects , such as physiology . Ramanujan failed his Fellow of Arts exam in December 1906 and again a year later . Without a degree , he left college and continued to pursue independent research in mathematics , living in extreme poverty and often on the brink of starvation .

= = Adulthood in India = =

On 14 July 1909 , Ramanujan married a ten @-@ year @-@ old girl , Srimathi Janaki (Janakiammal) (21 March 1899 ? 13 April 1994) . It was not unusual for marriages to be arranged with young girls . Some sources claim Janaki was nine years old when they married . She came from Rajendram , a village close to Marudur (Karur district) Railway Station . Ramanujan 's father did not participate in the marriage ceremony .

After the marriage , Ramanujan developed a hydrocele testis . The condition could be treated with a routine surgical operation that would release the blocked fluid in the scrotal sac , but his family did not have the money for the operation . In January 1910 , a doctor volunteered to do the surgery for free .

After his successful surgery , Ramanujan searched for a job . He stayed at friends ' houses while he went door to door around Madras looking for a clerical position . To make money , he tutored students at Presidency College who were preparing for their F.A. exam .

In late 1910 , Ramanujan was sick again . He feared for his health , and told his friend R. Radakrishna Iyer to " hand these [Ramanujan 's mathematical notebooks] over to Professor Singaravelu Mudaliar [the mathematics professor at Pachaiyappa 's College] or to the British professor Edward B. Ross , of the Madras Christian College . " After Ramanujan recovered and retrieved his notebooks from Iyer , he took a train from Kumbakonam to Villupuram , a coastal city under French control .

= = = Attention towards mathematics = = =

Ramanujan met deputy collector V. Ramaswamy Aiyer , who had recently founded the Indian Mathematical Society . Wishing for a job at the revenue department where Aiyer worked , Ramanujan showed him his mathematics notebooks . As Aiyer later recalled :

I was struck by the extraordinary mathematical results contained in it [the notebooks] . I had no mind to smother his genius by an appointment in the lowest rungs of the revenue department .

Aiyer sent Ramanujan , with letters of introduction , to his mathematician friends in Madras . Some of them looked at his work and gave him letters of introduction to R. Ramachandra Rao , the district collector for Nellore and the secretary of the Indian Mathematical Society . Rao was impressed by

Ramanujan 's research but doubted that it was his own work . Ramanujan mentioned a correspondence he had with Professor Saldhana , a notable Bombay mathematician , in which Saldhana expressed a lack of understanding of his work but concluded that he was not a phony . Ramanujan 's friend C. V. Rajagopalachari tried to quell Rao 's doubts about Ramanujan 's academic integrity . Rao agreed to give him another chance , and listened as Ramanujan discussed elliptic integrals , hypergeometric series , and his theory of divergent series , which Rao said ultimately converted him to a belief in Ramanujan 's brilliance . When Rao asked him what he wanted , Ramanujan replied that he needed work and financial support . Rao consented and sent him to Madras . He continued his research , with Rao 's financial aid taking care of his daily needs . With Aiyer 's help , Ramanujan had his work published in the Journal of the Indian Mathematical Society .

One of the first problems he posed in the journal was :

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He waited for a solution to be offered in three issues , over six months , but failed to receive any . At the end , Ramanujan supplied the solution to the problem himself . On page 105 of his first notebook , he formulated an equation that could be used to solve the infinitely nested radicals problem .

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