



INFLUENCE OF SRINIVASA RAMANUJAN and IT Day

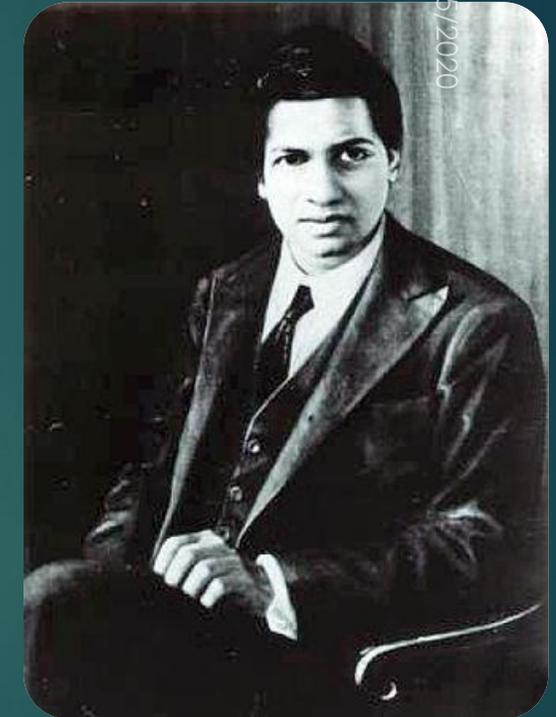
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Introduction

- ▶ **Srinivasa Iyengar Ramanujan** was an Indian mathematician and autodidact. He was born on 22 December 1887 in Erode, Madras.
- ▶ He died on 26 April 1920 in Chetput, Madras (Now Chennai).
- ▶ He received his Alma Mater from Government Arts College, Pachaiyappa's College and Trinity College, Cambridge.
- ▶ His academic advisors were Godfrey Harold **Hardy** and John Edensor **Littlewood**.
- ▶ He had no formal training in mathematics but was expert in trigonometry at the age of 12. He used to discover theorems of his own.

EARLY life

- ▶ He lived in Sarangapani Street in **Kumbakonam**.
- ▶ He had gone school first on October 1st, 1892. He had to switch primary school 3 times due to circumstances .
- ▶ Once, he had completed his exam in half the allotted time.
- ▶ In 1903, Ramanujan obtained from a friend a library copy of ***A Synopsis of Elementary Results in Pure and Applied Mathematics***, G. S. Carr's collection of 5,000 theorems.
- ▶ **He reportedly studied the contents of the book in detail. The book is generally acknowledged as a key element in awakening his genius.**
- ▶ He had left college without a degree and pursued research in mathematics.



Contacting British mathematicians



- ▶ **Godfrey Harold Hardy** was an academician at Cambridge University.
On 16 January 1913,
Ramanujan wrote to G. H. Hardy.
He recognised some of Ramanujan's formulae but others were impossible to believe.
- ▶ **Hardy believed that Ramanujan's theorems must be true** otherwise no one could have imagined to invent them.
- ▶ **Hardy invited Ramanujan to Cambridge University but Ramanujan refused.** He then enlisted **E. H. Neville (Hardy's colleague)** to bring Ramanujan to England. With his parents supporting him he agreed to the proposal this time.

Eric Harold Neville

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**Eric Harold Neville,
known as E. H. Neville.**

(1 January 1889 London, England – 22 August 1961 Reading, Berkshire, England)

He was an English mathematician interested in fourdimensional space.

A heavily fictionalised portrayal of his life is rendered in the 2007 novel *The Indian Clerk*.

He is the one who convinced Srinivasa Ramanujan to come to England.



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Life In England

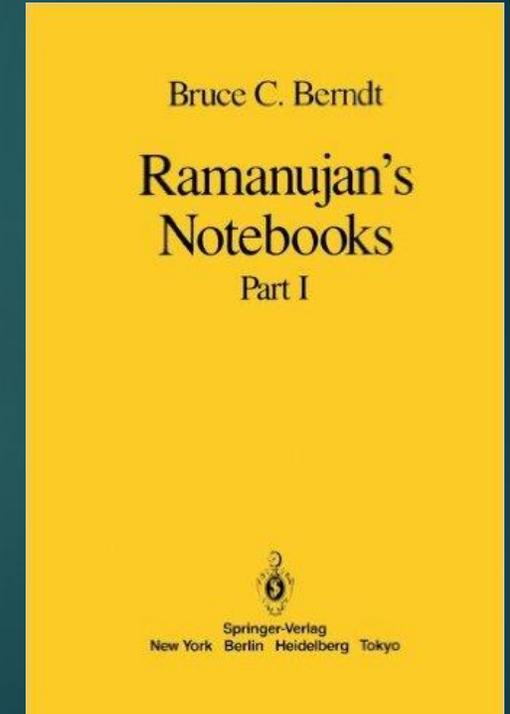
- ▶ **Ramanujan** departed from Madras aboard the S.S. *Nevasa* on **17 March 1914** and arrived in London on **14 April 1914**.
He began working with Hardy and Littlewood.
- ▶ Hardy had received **120 theorems from Ramanujan in the first two letters**, but there were many more results and theorems in the notebooks .
- ▶ **Ramanujan spent nearly 5 years in Cambridge .**
- ▶ He was awarded a Bachelor of Science degree by research (this degree was later renamed PhD) in **March 1916** for his work on highly composite numbers.
- ▶ On **6 December 1917**, he was elected to the London Mathematical Society .
- ▶ In **1918** he was elected a Fellow of the Royal Society .
- ▶ He became the first Indian to be elected a Fellow of Trinity College, Cambridge .

Illness and return to India

- ▶ **Ramanujan's health worsened in England.**
- ▶ Diagnosed with tuberculosis and
a severe vitamin deficiency.
- ▶ In 1919 he returned to Kumbakonam, Madras Presidency,
and soon thereafter, **in 1920**, died at the age of 32.
- ▶ In 1994, Dr. D. A. B. Young analysed his records and
concluded that he had hepatic amoebiasis.

Ramanujan's notebooks

- ▶ **Ramanujan recorded his results in four notebooks of loose-leaf paper.** They were mostly written up without any derivations.
- ▶ Mathematician Bruce C. Berndt says that Ramanujan most certainly was able to prove most of his results, but chose not to.
- ▶ **Since paper was very expensive, Ramanujan would do most of his work and perhaps his proofs on slate.**
- ▶ **He was also quite likely to have been influenced by the style of G. S. Carr's book, which stated results without proofs.**
- ▶ Mathematicians such as Hardy, G. N. Watson, B. M. Wilson, and Bruce Berndt created papers exploring material from Ramanujan's work.



Hardy–Ramanujan number 1729

- ▶ The number 1729 is known as the Hardy–Ramanujan number after a famous visit by Hardy to see Ramanujan at a hospital.
- ▶ Hardy arrived in a cab numbered 1729.
- ▶ Hardy commented that the number was very uninteresting.
- ▶ Instantly Ramanujan claimed that it was the smallest natural number which can be **as the sum of two cubes in two different ways**.
- ▶ The two different ways are:

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



Recognition of Ramanujan

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- ▶ **Tamil Nadu celebrates 22 December (Ramanujan's birthday) as 'State IT Day'.**
- ▶ A stamp picturing Ramanujan was released by the Government of India in 1962 – the 75th anniversary of Ramanujan's birth.
- ▶ **22 December, has been annually celebrated as Ramanujan Day by the Government Arts College, Kumbakonam.**
- ▶ The SASTRA University, based in the state of Tamil Nadu in South India,
has instituted the SASTRA Ramanujan Prize of US\$10,000 to be given annually to a mathematician not exceeding the age of 32 for outstanding contributions in an area of mathematics influenced by Ramanujan.

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