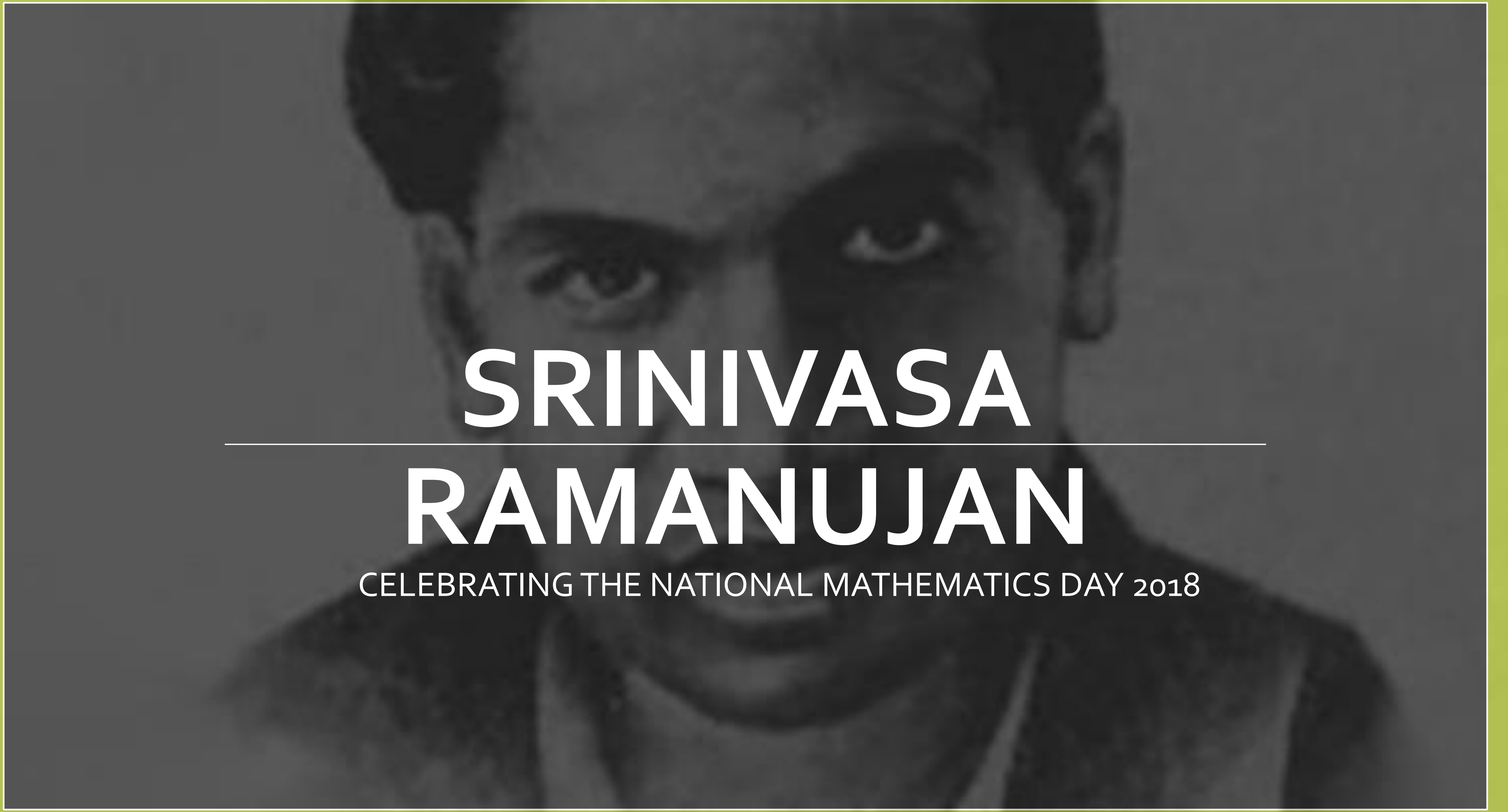

SRINIVASA RAMANUJAN

CELEBRATING THE NATIONAL MATHEMATICS DAY 2018

BIRTH AND EARLY LIFE

- **Born:** 22 December 1887 in Erode, India
- **Died** : 26 April 1920 in Chetput,British India because of hepatic amoebiasis.
- His mother was a housewife and his father worked as a clerk in a sari shop
- He could not spent a stable childhood because of his poor family and their life standarts

ADOLESCENCE

- By age 12,he mastered an advanced trigonometry book written by S.L. Looney by himself.
- After his graduation from high school,he could not get a degree from both colleges he entered at different times(Government College,Pachaiyappa’s College) due to his unwillingness about subjects except mathematics and he could not enter any university
- He has become seriously ill from time to time and they took so much time to be recovered.

Adulthood

He was married to a nine year old girl named Janaki Ammal when he was 22 but he did not live with his wife till she was 12.

Despite the fact that he was not educated well he was known to the university mathematicians by his works and growing fame in Madras,where he had his second college experience in.

Ramanujan has been publishing his works with the help of people who admired his talent in Journal of Indian Mathematical Society

- He got a temporary job in Madras Accountant General’s office,after that he was accepted as a clerk in Chief Accountant of the Madras Port Trust. He did easily what he was given and he spent his spare time with mathematical research,which his boss encouraged him about.
- Since he has showed his supernatural talent by himself,again people around him tried to connect with big English matematicians about Ramanujan.G.H. Hardy thought at first it could be fraud because most of Ramanujan’s works were impossible to believe.But eventually,they were convinced and interested in his talent.

TIME IN ENGLAND

- He was invited England to improve his works by G.H. Hardy and J.E. Littlewood,who were two of big mathematicans at this time.
- Hardy and Ramanujan had two opposite personalities.As Hardy was an atheist and believes mathematical proof and analysis,Ramanujan was a deeply religious guy and he believed in his trustworthy intuition.Hardy had hard times on his education without giving any damage on his self confidence and his values.
- He was elected to the London Mathematical Society and he became a Fellow of the Royal Society.

DEATH

- He had his entire life with health problems but his health has been worse in England due to stress,lack of vegetarian food and being far away from home.
- Ramanujan returned India in 1919 and after a short while he died in India despite medical treatment.

He was a religious man.

He often said, "*An equation for me has no meaning, unless it represents a thought of God*."

- Hardy and Littlewood had so many troubles while they have been educating him.
- Once Littlewood said about it, "*it was extremely difficult because every time some matter, which it was thought that Ramanujan needed to know, was mentioned, Ramanujan's response was an avalanche of original ideas which made it almost impossible for Littlewood to persist in his original intention.*"

His achievements

- Divergent series
- Hyper Geometric series and continued Fraction
- Definite Integrals
- Elliptic Functions
- Partition functions
- Fractional Differentiation:
- Theory of Numbers
- Partition of whole numbers:
- Highly Composite Numbers

Taxicab Number

1729

equals

$1^3 + 12^3$

equals

$9^3 + 10^3$

1729

is a sum of two cubes in two different ways

Ramanujan's Magic Square

22	12	18	87
88	17	9	25
10	24	89	16
19	86	23	11

22	12	18	87
88	17	9	25
10	24	89	16
19	86	23	11

- Sum of numbers of any row is 139.
- Sum of numbers of any Column is 139.

RAMANUJAN'S MAGIC SQUARE

22	12	18	87
88	17	9	25
10	24	89	16
19	86	23	11

22	12	18	87
88	17	9	25
10	24	89	16
19	86	23	11

Sum of numbers of any diagonal is also 139.
Sum of corner numbers is also 139.

22	12	18	87
88	17	9	25
10	24	89	16
19	86	23	11

Look at these possibilities. Sum of identical coloured boxes is also 139.

22	12	18	87
88	17	9	25
10	24	89	16
19	86	23	11

22	12	18	87
88	17	9	25
10	24	89	16
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RAMANUJAN'S MAGIC SQUARE

22	12	18	87
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22	12	18	87
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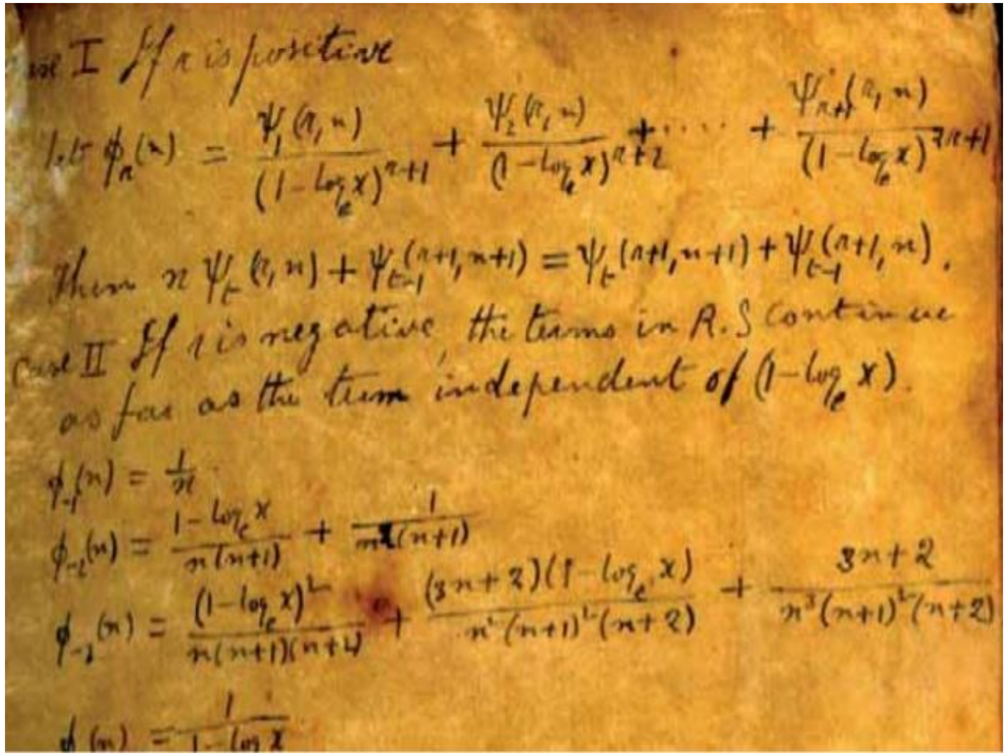
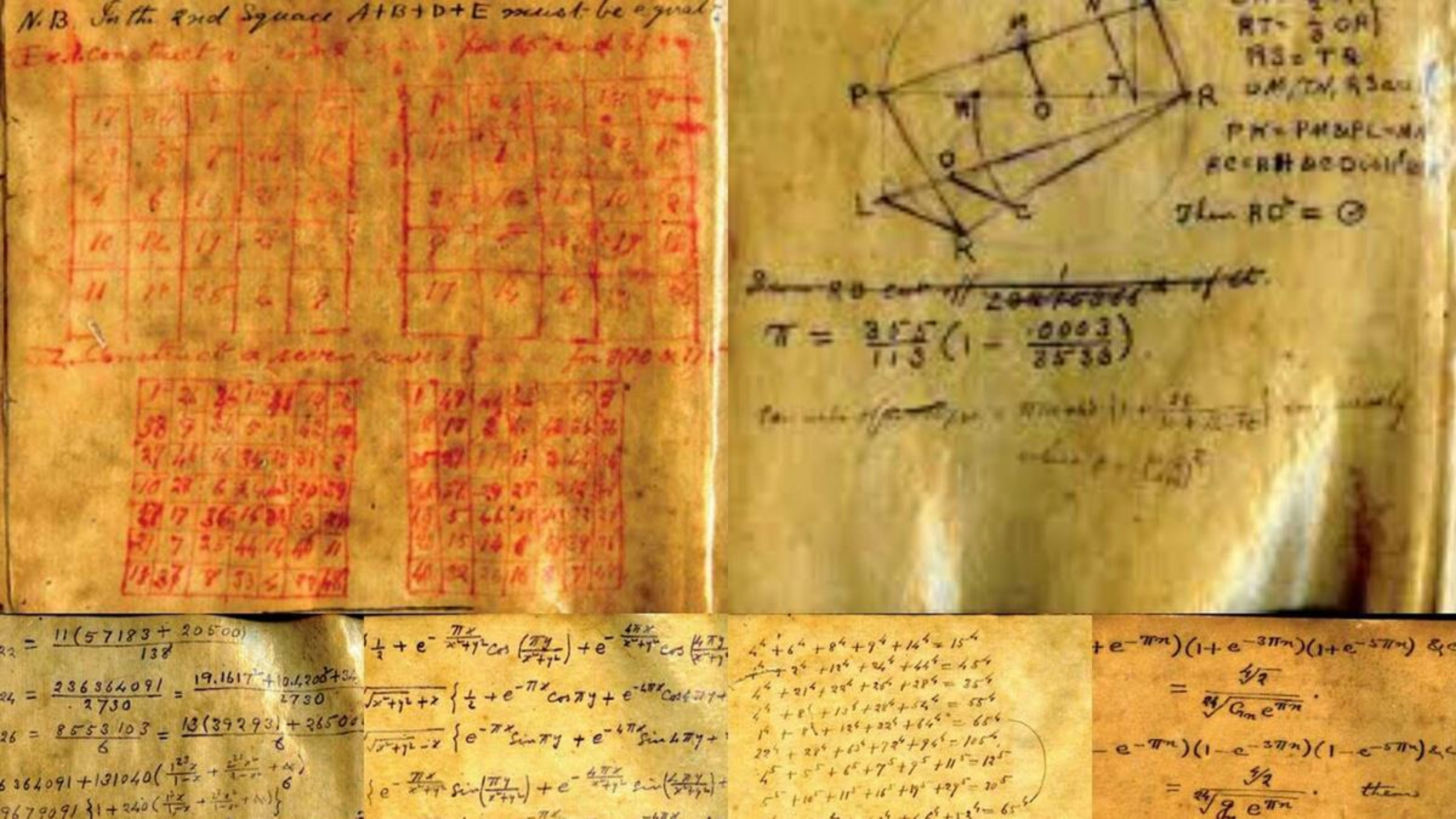
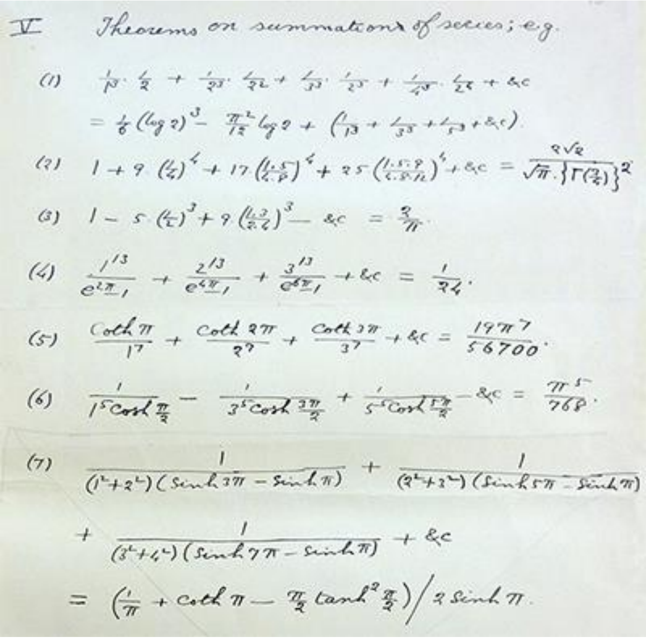
- You can also find Ramanujan Birthday from the square
- Yes. It is 22.12.1887

NOTES AND CALCULATIONS DONE BY RAMANUJAN HIMSELF




N.B. In the 2nd Square A+B+D+E must be equal
RT = 1/3 OR
RS = TQ
P
R
L
C
Q
Then RD² = ⊙
π = 355/113 (1 − ·0003/3533)
4⁴ + 6⁴ + 8⁴ + 9⁴ + 14⁴ = 15⁴
= 11(57183 + 20500)/138
= 236364091/2730
= 8553103/6
= 4√2/(24√(Gₙ e^{πn}))
= 4√2/(24√(gₙ e^{πn}))
then



V Theorems on summation of series; e.g.

(1) $\frac{1}{1^3}\cdot\frac{1}{2} + \frac{1}{2^3}\cdot\frac{1}{2^2} + \frac{1}{3^3}\cdot\frac{1}{2^3} + \frac{1}{4^3}\cdot\frac{1}{2^4} + \&c$

$= \frac{1}{6}(\log 2)^3 - \frac{\pi^2}{12}\log 2 + \left(\frac{1}{1^3} + \frac{1}{3^3} + \frac{1}{5^3} + \&c\right)$.

(2) $1 + 9\left(\frac{1}{4}\right)^4 + 17\left(\frac{1\cdot5}{4\cdot8}\right)^4 + 25\left(\frac{1\cdot5\cdot9}{4\cdot8\cdot12}\right)^4 + \&c = \frac{2\sqrt{2}}{\sqrt{\pi}\cdot\{\Gamma(\frac{3}{4})\}^2}$

(3) $1 - 5\left(\frac{1}{2}\right)^3 + 9\left(\frac{1\cdot3}{2\cdot4}\right)^3 - \&c = \frac{2}{\pi}$.

(4) $\frac{1^{13}}{e^{2\pi}-1} + \frac{2^{13}}{e^{4\pi}-1} + \frac{3^{13}}{e^{6\pi}-1} + \&c = \frac{1}{24}$.

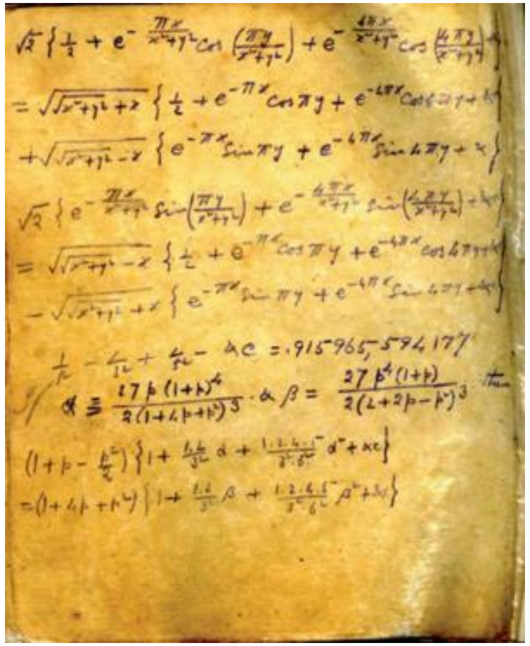
(5) $\frac{\coth\pi}{1^7} + \frac{\coth 2\pi}{2^7} + \frac{\coth 3\pi}{3^7} + \&c = \frac{19\pi^7}{56700}$.

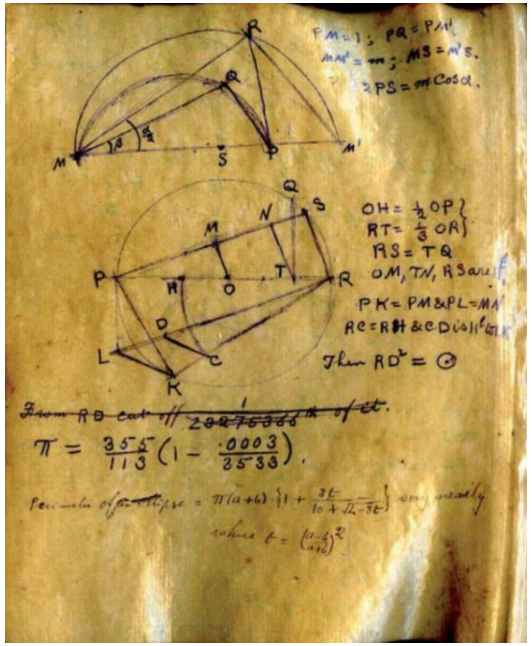
(6) $\frac{1}{1^5\cosh\frac{\pi}{2}} - \frac{1}{3^5\cosh\frac{3\pi}{2}} + \frac{1}{5^5\cosh\frac{5\pi}{2}} - \&c = \frac{\pi^5}{768}$.

(7) $\frac{1}{(1^2+2^2)(\sinh 3\pi - \sinh\pi)} + \frac{1}{(2^2+3^2)(\sinh 5\pi - \sinh\pi)}$

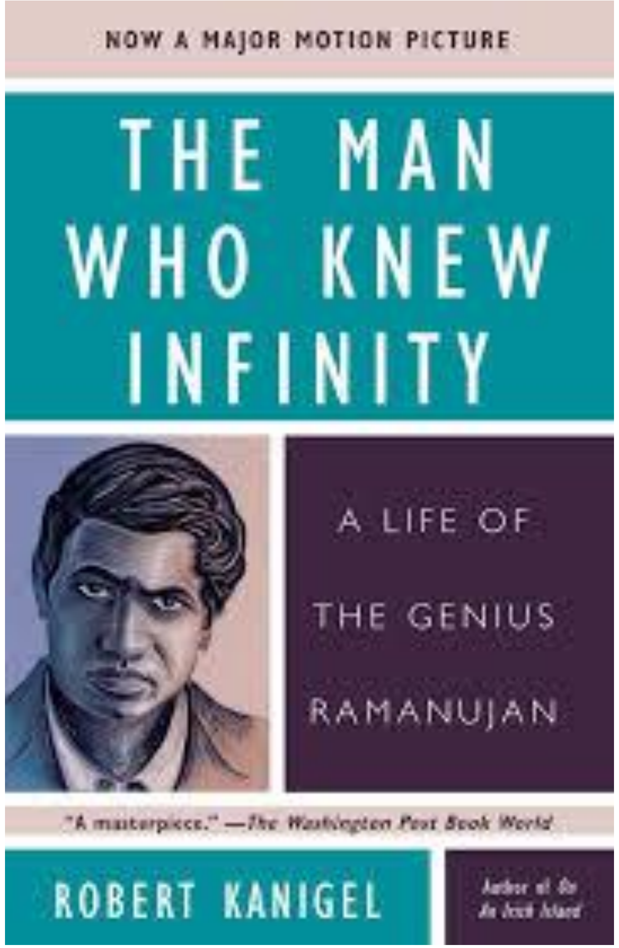
$+ \frac{1}{(3^2+4^2)(\sinh 7\pi - \sinh\pi)} + \&c$

$= \left(\frac{1}{\pi} + \coth\pi - \frac{\pi}{2}\tanh^2\frac{\pi}{2}\right)/2\sinh\pi$.





THESE PAGES LONG TO HIS LAST BOOK


NOW A MAJOR MOTION PICTURE
THE MAN WHO KNEW INFINITY
A LIFE OF THE GENIUS RAMANUJAN
"A masterpiece." —The Washington Post Book World
ROBERT KANIGEL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ராமானுஜன்


GREAT KNOWLEDGE COMES FROM THE HUMBLEST OF ORIGINS
DEV PATEL JEREMY IRONS
THE MAN WHO KNEW INFINITY
INTRODUCING DEVIKA BHISE
WITH STEPHEN FRY
AND TOBY JONES
BASED ON THE TRUE STORY

THANK YOU !