

Mathematician of the week

Srinivasa Ramanujan
Born 1887 – Died 1920



Ramanujan was born in Madras in South India at the end of the 19th Century. As a small child he suffered from smallpox and he was very shy. However he was an excellent mathematician and aged 7 won a scholarship to high school.

Ramanujan liked to work problems with chalk on a slate, erasing his calculation with his elbow as he went. Because of this very few pieces of his work have survived. His favourite position for doing maths was lying on his stomach. He would scribble page after page refusing to stop. Sometimes his mother and wife had to come and feed him while he continued to work

In 1914 he came to England (Trinity College, Cambridge) to study with another famous mathematician G.H. Hardy. In 1918 he was elected Fellow of the Royal Society of London and a Fellow of Trinity college. He was the first Indian to receive either honour.

He was however very unhappy and became ill returning to India where he died in 1920 aged only 32. When he was very ill, Hardy went to visit him in hospital. Not knowing what to say he made a comment about his taxi which was number 1729. Ramanujan immediately said 1729 is a fascinating number. It is the smallest number that can be expressed as the sum of two cubes in two different ways.

In 1976 a small box of Ramanujan's papers were found in a vault in Cambridge. Computers are now proving that he was one of the greatest geniuses who ever lived.

Here are some of the problems Ramanujan is famous.

1. On the way to hospital to visit Ramanujan his mentor took a taxi numbers 1729. Ramanujan remarked that is the smallest number that can be expresses as the sum of two cubes in two different ways. What are those 2 ways?
2. Ramanujan found a formula for the number of partitions a number has. A partition is a way of expressing an integer as the sum of other integer.

Eg: $5 = 1 + 1 + 1 + 1 + 1$

$$5 = 2 + 1 + 1 + 1$$

$$5 = 2 + 2 + 1$$

$$5 = 3 + 1 + 1$$

$$5 = 3 + 2$$

$$5 = 4 + 1$$

$$5 = 5$$

How many partitions do the numbers 6 and 7 have? Write them out.

3. Magic dominoes.
 - Imagine a domino – count the dots on the left side.
 - Multiply this number by 5
 - Add 7
 - Multiply by 2
 - Add the number of dots on the right hand side.
 - Subtract 14 from the result.

What do you notice?

Explain how this works?

Answers to Ramanujan's problems

1. $1729 = 1^3 + 12^3 = 9^3 + 10^3$.
2. 6 has 11 partitions, 7 has 15 partitions.
3. The tens digit is the number on the left hand side of the domino.
The units digit is the numbers on the right hand side of the domino.