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A 125th-Birthday Gift for Srinivasa Ramanujan

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Indian mathematician and genius Srinivasa Ramanujan was born on 22 December 1887 (expressed as 22-12-1887 or simply, 22121887) in Erode, Madras, India and died on 26 April 1920 (26041920) at 32 in Kumbakonam, Madras, India [1]. Saturday, 22 December 2012 marks his 125th birthday. On this special occasion, I constructed the following numerical brainteasers involving some numbers connected to his life as a birthday gift for him:

1. Ramanujan's single full birth date expressed as 22121887 is very special. How? 22121887 is the 1396426th prime number [2] where $1396426 = 2 \times 31 \times 101 \times 223$. These four prime factors add up to 357 and coincidentally, Ramanujan's birthday (22 December) corresponds to the 357th day of 2012 (and every other leap year)! Wow!
2. Ramanujan's birthday 22121887 can be constructed from the first ten digits of Euler's number e without using any arithmetic. (Note that the first ten digits of Euler's number are $e = 2.718281828$.) Can you figure out how? (Hint: Since you need only two 8 digits, place each pair of the four 8 digits on the top of each other.)
3. Ramanujan's birthday 22 December is also connected to the first three digits of pi. How? Add the squares of numbers 22 and 12 (which represent 22 December) and take half of the result. What comes out? (314!)
4. There is a numerical connection between Ramanujan's full name and his death day. How? If numbers 1 to 26 are assigned to the letters of the English alphabet as $A = 1, B = 2, C = 3$, etc., the numbers assigned to the letters of Srinivasa and Ramanujan each add up to 112 and 93. Interestingly enough, one fourth of the product of numbers 112 and 93 (representing Srinivasa Ramanujan) yield 2604 representing 26 April!
5. Interestingly enough, the first 21 and 22 digits of Euler's number e each add up to 93 corresponding to the sum of the numbers assigned to the letters of "Ramanujan" where 22 and reverse of 21 put side by side as 2212 represent Ramanujan's birthday, 22 December! In addition, note that twice the sum of the first twelve digits of e yields 112, corresponding to "Srinivasa."
6. Numbers 112 and 93 (representing Srinivasa Ramanujan) also mutually share an interesting numerical property: The sum of their squares is 21193 where the reverse of the leftmost three digits is 112 and the rightmost two digits equals 93!
7. Ramanujan's name is also "cryptically" connected to the Hardy-Ramanujan number 1729 [3, 4]. How? The prime factors of 1729 are 7, 13 and 19 and interestingly enough, these three prime factors add up to 39, the reverse of which is 93, corresponding to Ramanujan.
8. In addition, Ramanujan's death year can simply be produced using the prime factors of 1729. How? Primes 7 and 13 add up to 20, and 19 and 20 put side by side yield 1920, the year Ramanujan died.

9. Also, if the rightmost two digits of 1729 are switched, twice 1792 equals to the product of the digits of 22121887. In addition, 1792 times the special number 12345 yields one of Ramanujan's future birthdays 22122240 that is divisible by his death year 1920!
10. Ramanujan's 125th birthday is special not only because 125 years represent one eighth of a millennium but also for other reasons. Why? First, 22 December 2012 is Ramanujan's 125th birthday and coincidentally, the 93rd anniversary of Ramanujan's death day is to occur exactly 125 days after this day! Amazing!
11. Second, the 125th prime number 691 and its reverse 196 add up to 887 which coincide with the rightmost three digits of Ramanujan's birth year, 1887.
12. Next, using basic arithmetic, Ramanujan's birthday number 125 can be produced from the digits of the Hardy-Ramanujan number 1729 as $7 \times 2 \times 9 - 1 = 125$!
13. Also, half of the sum of the reverses of numbers 112 and 93 (representing Srinivasa Ramanujan) yields 125!
14. In addition, the sum of the digits of Ramanujan's 125th birthday expressed as 22122012 is 12 (the month number of his birthday), the sum of the squares of the digits is 22 (the day number of his birthday), and the product of its nonzero digits is 32 (signifying his death age).
15. Ramanujan's last birthday in this (21st) century (his 213th) expressed as 22122100 is unique because it is divisible by the first seven prime numbers except 3, since $22122100 = 2 \times 2 \times 5 \times 5 \times 7 \times 11 \times 13 \times 13 \times 17$. Additionally, if 22122100 is split as 22, 12, 21, and 00, the sum of these numbers yield 55, which also equals to the sum of the prime factors of 22122100.
16. Lastly, Ramanujan's palindrome birthday 22 December is to occur in the 22nd century on 22122122!

Thanks for your love for numbers and unprecedented contributions to mathematics Ramanujan, and have a happy 125th birthday!

[1] http://en.wikipedia.org/wiki/Srinivasa_Ramanujan

[2] <http://www.bigprimes.net/> (<http://www.bigprimes.net/cruncher/22121887/>)

[3] http://en.wikipedia.org/wiki/1729_%28number%29

[4] A. Inan, "Mystery number," + *Plus Magazine* puzzles, December 6, 2012

<http://plus.maths.org/content/mystery-number>