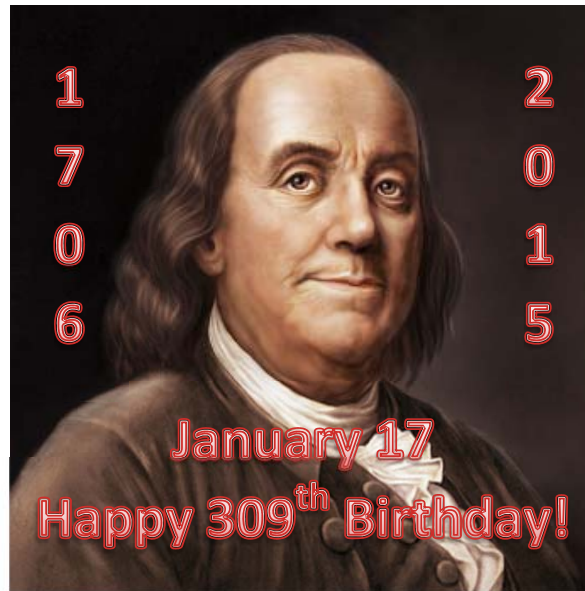


Ben Franklin's 309th Birthday Add Up to 17

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Benjamin Franklin
(January 17, 1706-April 17, 1790)

Saturday, January 17, 2015 marks Benjamin Franklin's 309th birthday [1-4]. In his honor and to celebrate his 309th birthday, I constructed the following numerical birthday brainteasers:

1. The digits of the full date of Franklin's 309th birthday expressed as 01-17-2015 (or simply, 01172015) add up to 17 and this is very special since number 17 holds a unique place in Franklin's life [4]. After his 309th, Franklin's next birthday which will have this property will be his 318th to occur in 2024.
2. If Franklin's 309th birthday 01172015 is split as 01, 17, 20, and 15, these four numbers add up to 53. Interestingly enough, half of the sum of the prime factors of number 309 (3 and 103) also yields 53. Also, 53 is the 16th prime number where 16 correspond to number of letters in Franklin's name, "Benjamin Franklin."
3. Five times the reverse of the sum of the reverses of the prime factors of Franklin's upcoming birthday number 309 (which are 3 and 301 since $309 = 3 \times 103$) yields 2015. Wow!
4. The sum of 309 and its reverse (903) yield 1212. Interestingly enough, in 1706, Franklin turned 309 days old on November 22, which can be expressed as 1122, which by swapping its middle digits also yield 1212.
5. If numbers 1 to 26 are assigned to the letters of "Benjamin" and "Franklin" in alphabetical order (A being 1, B is 2, etc.), the sum of the numbers assigned to the letters of these two names are 68 and 85, respectively. Interestingly enough, the sum of the reverses of these two numbers equals 144, which is 12×12 , where 12 and 12 side-by-side results in 1212, which is the sum of 309 and its reverse.
6. 1212 (which is 309 plus its reverse) equals 12×101 where 12 plus 101 is 113, where number 113 is 309 if expressed in base-17 number system. Also, 12 equal the sum of the digits of 309 and 101 equals the sum of the numbers assigned to the letters of "Philadelphia."

7. 2015 minus 1212 (sum of 309 and its reverse) yields 803, the reverse of which is 308, Franklin's age before he turns 309. Also, the sum of the cubes of the digits of 309 equals 27×28 , where twice the sum of the reverses of 27 and 28 equals 308.
8. In addition, 309 can be expressed as the sum of 117 (representing Franklin's birth date, January 17) and $3 \times 2^{3 \times 2}$, where 3×2 plus 3×2 yields 12, the sum of the digits of 309.
9. One third of the sum of the fourth powers of the digits of 309 equals 2214, which is 309 expressed in base-5 number system. Isn't this fun?
10. Lastly, the fifth power of 309 [that is, $(309)^5$] is a number that contains all the digits from 0 to 9, each digit appearing only once except digit 0 appears 6 times where 6 can be interpreted as the difference of the nonzero digits of 309.

I hope you enjoyed reading my numerical brainteasers regarding Franklin's 309th birthday and I hope you can help me find more brainteasers to be added to the above list.

Happy 309th birthday, Ben Franklin!

[1] A. S. Inan, "Happy 308th Birthday, Ben Franklin!," posted by M. Mangold, "Franklin Numerology for his 308th Birthday," *friendsoffranklin.org*, The Friends of Franklin, January 14, 2014.

[2] A. S. Inan, "Ben Franklin's 307th Birthday Possesses a Unique Numerical Property," *Franklin Gazette*, Vol. 22, No. 2, p. 2, Winter, 2012-2013.

[3] A. S. Inan, "Happy 306th Birthday, Ben Franklin!," *Franklin Gazette*, Vol. 21, No. 4, p. 1 and p. 10, Winter, 2011/2012.

[4] A. S. Inan, "More 17's in Ben Franklin's Life," *Franklin Gazette*, Vol. 21, No. 2, pp. 7-8, Summer, 2011.