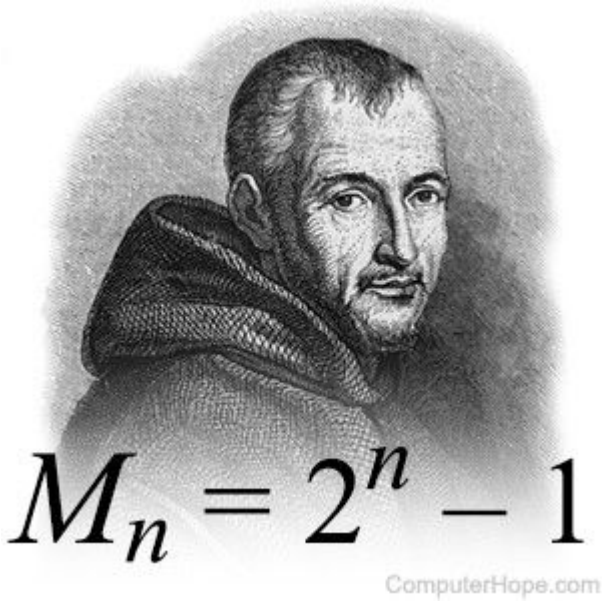
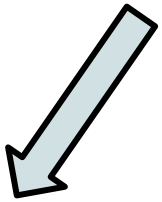
Mersenne Prime



$$2^n - 1 = \text{Prime } \#$$



$$2^n - 1 =$$ Prime #

Math String

2^2

2^3

2^4

3^2

3^3

3^4

4^2

4^3

4^4

$$2^n - 1 = \text{Prime } \#$$

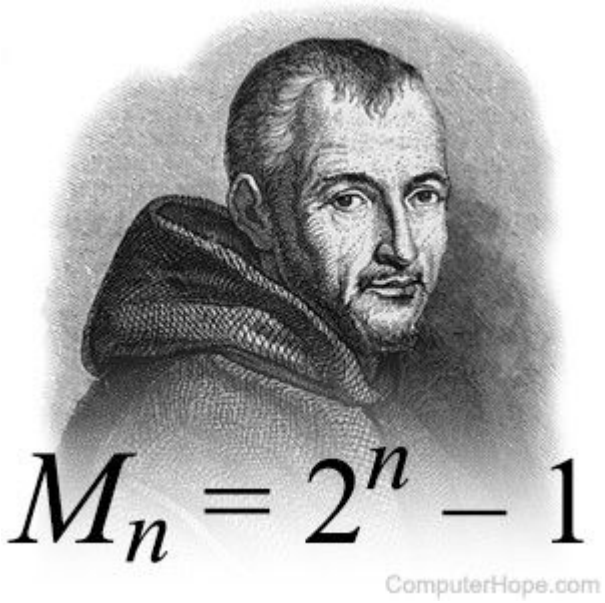
What are Prime #s

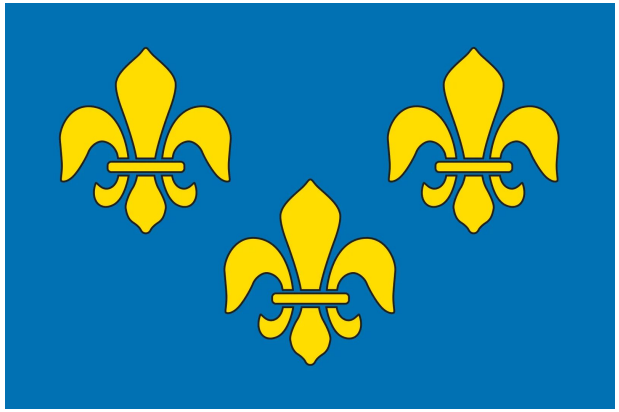
$$2^n - 1 = \text{Prime } \#$$

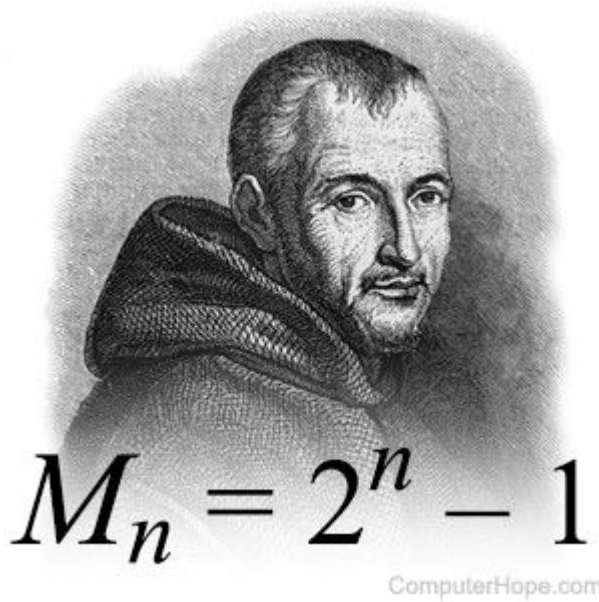
$$2^n - 1 = \text{Prime \#}$$

$2^2 - 1 = 3$ 

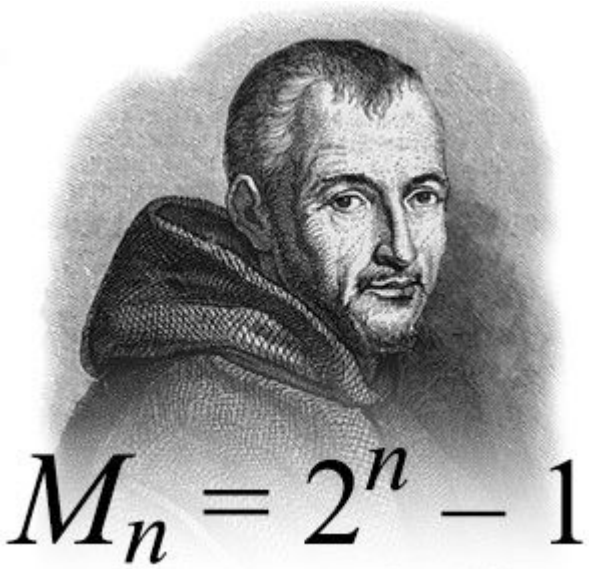
Mersenne Prime



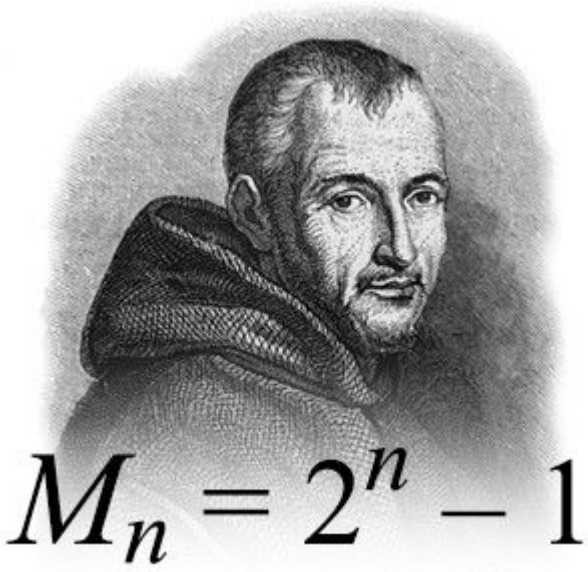




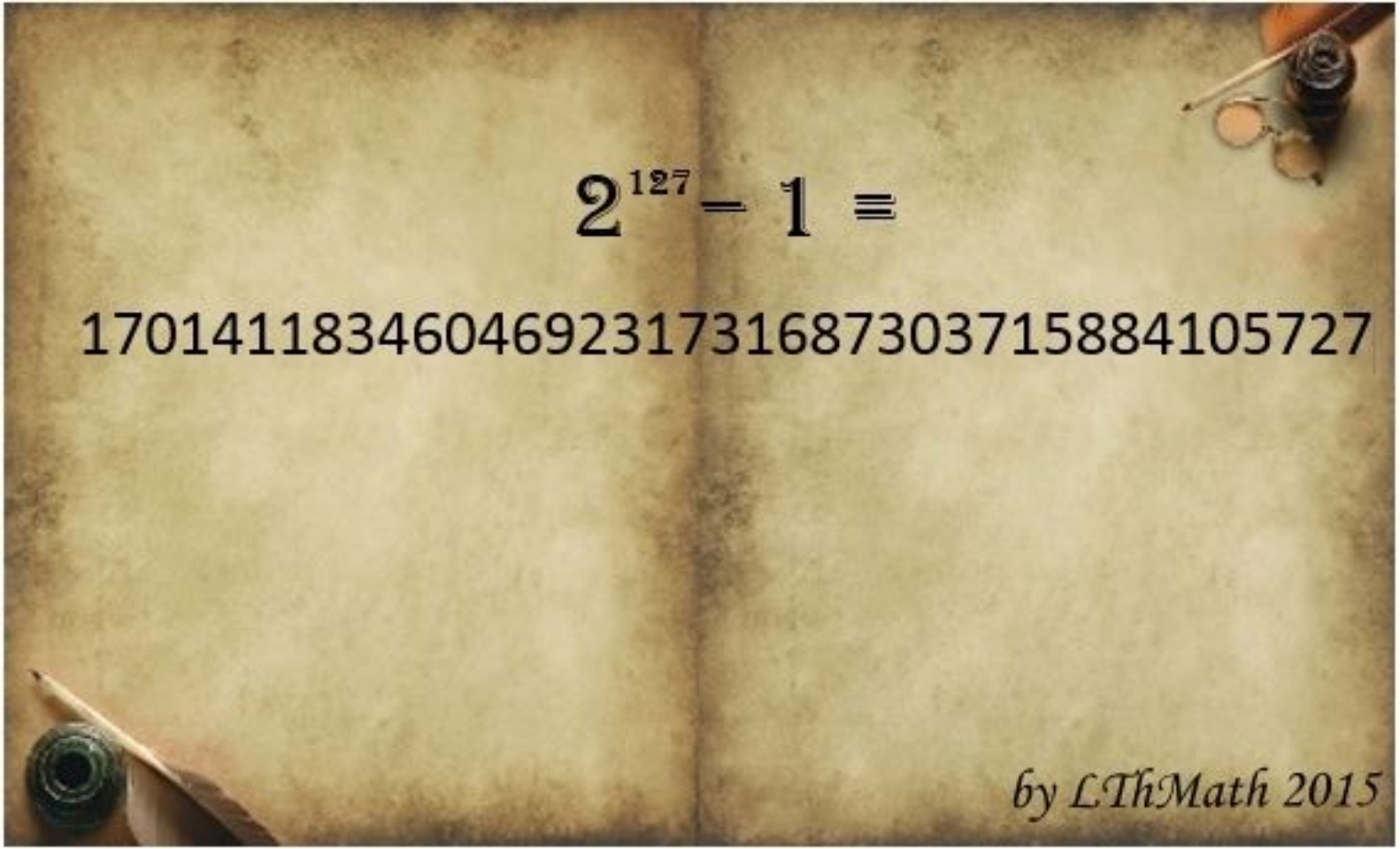
“Post-box of Europe”



When 2_n-1 is prime it is said to be a Mersenne prime.



n = 2, 3, 5, 7, 13, 17, 19, 31, 61, 89, 107 and 127.


$2^{127} - 1 \equiv$
170141183460469231731687303715884105727
by LThMath 2015

$2^2-1 = 3$

$2^3-1 = 7$

$2^5-1 = 31$

$2^7-1 = 127$

$2^{13}-1 = 8{,}191$

$2^{17}-1 = 131{,}071$

$2^{19}-1 = 524{,}287$

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?

$$2^{82{,}589{,}933} - 1$$

5^2

$2^2-1 = 3$

$2^3-1 = 7$

$2^5-1 = 31$

$2^7-1 = 127$

$2^{13}-1 = 8{,}191$

$2^{17}-1 = 131{,}071$

$2^{19}-1 = 524{,}287$

52 $2^{82{,}589{,}933} - 1$

Teacher Resources

https://primes.utm.edu/mersenne/

Mersenne Primes: History, Theorems and Lists

Contents:

1. Early History
2. Perfect Numbers and a Few Theorems
3. Table of Known Mersenne Primes
4. The Lucas-Lehmer Test and Recent History
5. Conjectures and Unsolved Problems
6. See also Where is the next larger Mersenne prime? and Mersenne heuristics

1. Early History

Many early writers felt that the numbers of the form 2^n-1 were prime for *all* primes *n*, but in 1536 Hudalricus Regius showed that 2^{11}-1 = 2047 was not prime (it is 23·89). By 1603 Pietro Cataldi had correctly verified that 2^{17}-1 and 2^{19}-1 were both prime, but then incorrectly stated 2^n-1 was also prime for 23, 29, 31 and 37. In 1640 Fermat showed Cataldi was wrong about 23 and 37; then Euler in 1738 showed Cataldi was also wrong about 29. Sometime later Euler showed Cataldi's assertion about 31 was correct.

Enter French monk Marin Mersenne (1588-1648). Mersenne stated in the preface to his *Cogitata Physica-Mathematica* (1644) that the numbers 2^n-1 were prime for

> *n* = 2, 3, 5, 7, 13, 17, 19, **31, 67, 127 and 257**

Prime Numbers to 100

A prime number can only be divided (without a remainder) by itself and 1.

2	3	5	7	11
13	17	19	23	29
31	37	41	43	47
53	59	61	67	71
73	79	83	89	97