Mersenne Numbers Encyclopedia Article

Mersenne Numbers

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Mersenne Numbers

Mersenne numbers are numbers of the form 2^p-1 where p is a prime number. If the Mersenne number 2^p-1 itself is prime then it is called a Mersenne prime. The first few are $2^2-1= 3$, $2^3-1 = 7$, $2^5-1= 31$, $2^7-1 = 127$ are all **prime numbers** but the next one, $2^{11}-1 = 2047$ is divisible by 23 and therefore is not prime.

Although Mersenne primes have been considered since antiquity because of their relation with **perfect numbers**, they are named after the French clergyman, Father **Marin Mersenne**, who, in 1644, made a list (with some errors) of the Mersenne primes with exponent p at most 257.

Most Mersenne numbers are not prime and, to date, 38 Mersenne primes have been discovered out of the more than 400,000 Mersenne numbers tested. It is believed, but not known for sure, that there exists infinitely many Mersenne primes. The largest known Mersenne prime is $2^{6972593}-1$, a number of more than two million digits, which was discovered by N. Hajratwala, G. Woltman and S. Kurowski who are all amateur mathematicians from the United States. It was found as part of the Great International Mersenne prime search, which is a worldwide effort to use idle time on home computers to find Mersenne primes and has led to advances in distributed computing. They use an implementation by G. Woltman of a test devised by the French mathematician E. Lucas and improved by the American mathematician D. N. Lehmer specifically to test the primality of Mersenne numbers.