More curiosities of prime numbers

Mersenne numbers

People have thought in methods to obtain prime numbers and one of these methods was thought by Mersenne, look at the following formula:

$$2^n - 1$$

the exponent '*n*' can be a natural number bigger than 1, we obtain numbers called Mersenne numbers:

$$2^2 - 1, \quad 2^3 - 1, \quad 2^4 - 1, \quad 2^5 - 1, \quad 2^6 - 1, \quad 2^7 - 1, \quad 2^8 - 1, \quad 2^9 - 1, \quad 2^{10} - 1, \ldots$$

Exercise:

a) Calculate the numbers given above.
b) Check if they are prime or composite numbers.
c) How are the exponents of prime numbers? Are they prime numbers? Are they composite numbers? How are the exponents of composite numbers?

Another curiosity: The biggest prime number of Mersenne we know is

$$2^{25964951} - 1$$

it was found in 2005 with the aid of a powerful computer, **it has more than 7 million decimal digits**. Think about the task to prove that this number is prime.