Hw #3   MME 529

Mersenne Primes

1. Why $2^n - 1$ and not $3^n - 1$ or $4^n - 1$ or $5^n - 1$ or $6^n - 1$?

2. Are you a Maple or Matlab user?

a) in Maple there is an   ***ithprime***   function. It returns the prime you specify. For example *ithprime(4)* returns the 4th prime, which is 7. *ithprime(i)* returns the ith prime.

b) in Matlab there is a **primes** function. You give it a number and it returns all the primes up to that number, a list.

So **primes(20)**   returns all the primes up to 20 hence

            2   3   5   7   11   13   17   19

Either way, you have something to work with. Try yours out.

Here is your small research project: *what percentage of primes do you think are also Mersenne primes?*

Use your software, do some research, come up with an estimate. Provide that and what you based it on. Two different people may well have different results. That's fine.

3. Can you find a Mersenne Prime where the exponent is itself a Mersenne prime?   (we know the exponent must be prime from class)

Fibonacci

4. Get the Binet formula out. For the cases n=3 and 4, verify that you really do get F_3 and F_4

5.   a) develop polynomial expressions for

        $1/\phi$, $1/\phi^2$, $1/\phi^3$, $1/\phi^4$, and $1/\phi^5$

      with simple algebra. ($1/\phi = \phi - 1$, just to get your going)

     b) can you see a formula emerging for $1/\phi^n$?