

MATH 312: ASSIGNMENT 2
DUE DATE: SEPTEMBER 28, 2012

- 1) Prove that the integer $Q_n = n! + 1$, where n is a positive integer, has a prime divisor greater than n . Use this to show that there are infinitely many primes.
- 2) Show that there are no prime triplets of the form $p, p + 2$ and $p + 6$.
- 3) Show that there are infinitely many primes that are not one of the primes in a pair of twin primes. (Hint: Use Dirichlet's theorem.)
- 4) Use the Prime Enumeration Sieve to list all prime numbers between 50 and 100,
- 5) Show that the greatest common divisor of an even number and an odd number is odd.
- 6) What is $(a^2 + b^2, a + b)$, where a and b are relatively prime integers that are not both 0.
- 7) How many digits is the n -th prime where $n = 598709$ likely to have?