

Math 4513

4.
 - a. Show that $x^n - 1 = (x - 1)(x^{n-1} + x^{n-2} + \cdots + x^2 + x + 1)$.
 - b. Deduce from part a that if $m = nk$ then $2^m - 1$ is divisible by $2^k - 1$.
 - c. Deduce from part b that if $2^m - 1$ is prime then m must be prime.
5.
 - a. Show that if n is odd then $x^n + 1 = (x + 1)(x^{n-1} - x^{n-2} + \cdots + x^2 - x + 1)$.
 - b. Deduce from part a that if $m = nk$ and n is odd then $2^m + 1$ is divisible by $2^k + 1$.
 - c. Deduce from part b that if $2^m + 1$ is prime then m must be a power of 2.
6. Explain how to construct a regular hexagon with ruler and compass.
7. Given a triangle with vertices A , B , and C , explain how to construct a circle which passes through A , B , and C .