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**Stephen Lovett\*** ([stephen.lovett@wheaton.edu](mailto:stephen.lovett@wheaton.edu)). *Sequences preserving GCD, Cyclotomic Polynomials, and Iterated Polynomials.*

In almost all algebra texts define cyclotomic polynomials in reference to the primitive  $n$ 'th roots of unity. However, as we will show, the property that  $\gcd(x^n - 1, x^m - 1) = x^{\gcd(m,n)} - 1$  is sufficient to uniquely define the cyclotomic polynomials. In this talk, we present a factorization property about sequences that preserve the greatest common divisor. We illustrate the property with sequences already known to possess this property and present some new sequences. As applications, we show how one can define cyclotomic polynomials without reference to roots of unity. Then we generalize the concept of cyclotomic polynomials to iterated polynomials and present a connection with discrete dynamical systems of polynomial functions. (Received August 26, 2011)