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Cyclotomic Polynomials of Order Three and Maximal Height of Divisors of $x^n - 1$.

The n th cyclotomic polynomial, Φ_n , is the monic polynomial whose roots are the primitive n th roots of unity. A cyclotomic polynomial has order three if n is the product of three primes, $p < q < r$. Let $A(n)$ be the maximum absolute value of a coefficient of Φ_n . The function $A(n)$ has been studied extensively and there are several interesting open questions related to $A(pqr)$. For each pair of primes $p < q$, we will give infinitely many r such that $A(pqr) = 1$. We will also discuss new periodicity results for $A(pqr)$.

We will also discuss the problem of determining the largest absolute value of a coefficient of any integer polynomial dividing $x^n - 1$. We will discuss new explicit results for the cases where n is equal to p^2q , pq^2 or pqr . We will also give a new general bound for the size of these coefficients. (Received February 23, 2007)