1125-11-2425 **Annie Chen**, **T. Alden Gassert*** (thomas.gassert@wne.edu) and **Katherine E. Stange**.

Index divisibility in dynamical sequences and cyclic orbits modulo p.

Let $\phi(x) = x^d + c$ be an integral polynomial of degree at least 2, and consider the sequence $(\phi^n(0))_{n=0}^{\infty}$, which is the orbit of 0 under iteration by ϕ. Let $D_{d,c}$ denote the set of positive integers n for which $n \mid \phi^n(0)$. We give a characterization of $D_{d,c}$ in terms of a directed graph and describe a number of its properties, including its cardinality and the primes contained therein. In particular, we study the question of which primes p have the property that the orbit of 0 is a single p-cycle modulo p. We show that the set of such primes is finite when d is even, and conjecture that it is infinite when d is odd. (Received September 20, 2016)