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Annie S. Chen* (annieboulder@gmail.com), **T. Alden Gassert**
(thomas.alden.gassert@gmail.com) and **Katherine E. Stange**
(kstange@math.colorado.edu). *Index Divisibility in Dynamical Sequences and Cyclic Orbits*
Modulo p . Preliminary report.

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 August 16, 2016)