1086-11-1799 **Carrie Finch**, **Joshua Harrington** and **Lenny Jones*** (lkjone@ship.edu), Department of Mathematics, Shippensburg University, 1871 Old Main Drive, Shippensburg, PA 17257. *Nonlinear Sierpiński and Riesel Numbers.*

In 1960, Sierpiński proved that there exist infinitely many odd positive integers k such that $k \cdot 2^n + 1$ is composite for all positive integers n. Such values of k are known as *Sierpiński numbers*. Extending the ideas of Sierpiński to a nonlinear situation, Chen showed that there exist infinitely many positive integers k such that $k^r \cdot 2^n + d$ is composite for all positive integers n, where $d \in \{-1, 1\}$, provided that r is a positive integer with $r \not\equiv 0, 4, 6, 8 \pmod{12}$. Filaseta, Finch and Kozek improved Chen's result by completely lifting the restrictions on r when $d = 1$, and they asked if a similar result exists if k^r is replaced by $f(k)$, where $f(x)$ is an arbitrary nonconstant polynomial in $\mathbb{Z}[x]$. In this article, we address this question when $f(x) = ax^r + bx + c \in \mathbb{Z}[x]$. In particular, we show, for various values of a, b, c, d and r, that there exist infinitely many positive integers k such that $f(k) \cdot 2^n + d$ is composite for all integers $n \geq 1$. When $d = 1$ or -1, we refer to such values of k as *nonlinear Sierpiński* or *nonlinear Riesel* numbers, respectively. (Received September 24, 2012)