1067-Z1-884 **William E Wood*** (wood@hendrix.edu), 1600 Washington Ave, Conway, AR 72032.

Squigonometry: Using Calculus to Develop New Transcendental Functions. Preliminary report.

The circle is ubiquitous in mathematics, and it is easy to take it for granted. We look to enhance our appreciation of the circle by developing an analog of trigonometry – a subject built upon analysis of the circle – for something that is *not quite* a circle. Our primary model will be the unit squircle, the superellipse defined as the set of points (x, y) in the plane satisfying $x^4 + y^4 = 1$. We will use an elementary initial value problem approach to develop functions that parameterize the squircle and behave much like their trigonometric analogs.

The ideas require only calculus, but take students through ideas in non-euclidean geometry, elliptic integrals, and complex analysis. The material has been used as a writing project in the second semester of an initial value problem-based calculus sequence. We will discuss this overall approach and how this topic provides students with opportunities to challenge their understandings of what it means to define new functions and how to balance computation with theory toward discovering and proving theorems about them. (Received September 16, 2010)