Connecting Equations: Ancient Ways to Modern Days Christian S. Hayes and Emma K. Benedict Mathematical Evolutions Jenny McCarthy and Andy Platek "Summer Ventures in Science and Mathematics" "The University of North Carolina at Charlotte"

## Abstract

Ever since the beginning of time, mathematical geniuses have spent lifetimes researching and inventing new ways to study and complete problems efficiently. Brahmagupta and Herron are two well-known mathematicians that used their research to express their interest in geometric shapes through their discoveries. Within our paper we will discuss the relation between Brahmagupta and Herons' ancient theorems to modern equations pertaining to quadrilaterals and triangles. Since Brahmagupta and Heron's theorems do continue to work for some shapes, the equations can still be utilized; however, within this paper we will explore the possibilities of utilizing their ancient theorems for figures with more than three to four sides. Once all of the formulas were studied, and the ancient formulas were proven, we attempted to alter the ancient Brahmagupta formula to work for a pentagon and a hexagon. Unfortunately, we did not have success in finding a single formula that would continually work for figures beyond the triangles and inscribed quadrilateral. By adding another side to Brahmagupta's formula, it changes the result of the semi-perimeter; therefore, preventing the ancient and modern equations from being equivalent.