1116-12-1035 **Michael Robert Keenan*** (mkeenan3@elon.edu) and **Chad Awtrey**. *Symmetries of Quartic Polynomials.*

In the 1500s mathematicians discovered all quartic polynomials are solvable by radicals, meaning we can find a quartic polynomial's roots using only using the coefficients of the polynomial, the basic arithmetic functions, and radicals. It wasn't until the 1800s when mathematicians showed why quartic polynomials are solvable by radicals and why not all polynomials of degree greater than four are. By attaching a group structure to a polynomial (called the polynomial's Galois group), we can determine whether the polynomial is solvable by radicals. We can also see the relationships among the roots. Naturally, a branch of mathematical research has emerged to develop methods to determine Galois groups of polynomials. Previous methods for determining Galois groups of quartic polynomials involve factoring and creating larger polynomials (called resolvent polynomials); a process which can be computationally inefficient. We will discuss how to compute the Galois group of a quartic polynomial that does not rely on factoring large-degree resolvents. Instead, we use only two pieces of data about the polynomial: (1) the number of roots in the field extension it defines, and (2) its discriminant. We will also compare the efficiency of this method to the efficiency of resolvent-based methods. (Received September 16, 2015)