Functional Equations: Rational Functions and Their Matrix Isomorphism

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Functional equations are equations involving unknown functions. Solving such equations can be tedious and perplexing. However, utilizing the power of abstract algebra, solving them can be made easier. In this project, an isomorphism between matrices and rational functions is used to solve functional equations. This isomorphism, which reveals the fundamental similarities between function composition and matrix multiplication, essentially takes these equations into another “realm” and allows matrix operations to be done in order to solve them. This project investigates a special matrix denoted Q_i, which allows for a form of commutativity in this isomorphism and also looks for methods to solve functional equations.

Awards Won:
Third Award of $1,000