

Department of Mathematics
University of Notre Dame

Katherine Novey & Cory Gillette - University of Notre Dame

Mathematics Teaching Seminar

Date: Tuesday, February 14, 2023

Location: 125 Hayes-Healy Bldg

Time: 5:00 pm

Title: Mock Lecture: Completing the Square

Speaker: Katherine Novey

University of Notre Dame

Abstract: Completing the square is an algebraic technique of manipulating an arbitrary quadratic function so that it is expressed as the sum of a multiple of a perfect square and a constant. In this form, one can immediately find the vertex of the graph of the function and can solve for the zeros without factoring or using the quadratic equation. In this lecture, we will discuss this technique in two ways: purely algebraically, and geometrically.

Title: Mock Lecture: Linear Approximation and a First Peek at Differentials

Speaker: Cory Gillette

University of Notre Dame

Abstract: Linear Approximation and a First Peek at Differentials Many phenomena in science and engineering can be mathematically modeled as differential equations, that is, equations for an unknown function, expressed in terms of the derivatives of that function, such as $f'(x) = kf(x)$, for some constant k and variable x . These functions are frequently non-linear, and in some cases, it is impossible to write an explicit formula for a function. Fortunately, it's usually enough for practical purposes to estimate values of an unknown function near a point on its graph obtained from measurements of the physical system it models. Moreover, even when a formula for the function is known, it is often computationally faster (or even necessary) to estimate its values. This lecture will be primarily motivated by examples and will cover the theory of linear approximation of functions; at the end, we will take a brief look at "differentials", a neat way of repackaging our discussion that is part of powerful machinery in more advanced courses.