MAT 270 Course Objectives

Calculus with Analytic Geometry I

- Evaluate the limit of a function using numerical and algebraic techniques, the properties of limits, and analysis techniques.
- Evaluate one-sided and two-sided limits for algebraic and trigonometric functions.
- Determine analytically whether a limit fails to exist.
- Use the formal definition to prove a limit; i.e. do simple $\epsilon - \delta$ proofs of limits.
- Use the formal definition of the derivative to find the derivative of an algebraic function.
- Apply the basic rules of differentiation to find the derivative of a function including the constant, power, sum, product, quotient, and Chain rules.
- Find first-order and higher-order derivatives of algebraic and transcendental functions and their inverses.
- Find the derivatives of functions and relations using implicit differentiation.
- Solve applied problems using the derivative including rates of change, the tangent line problem, and related rates.
- Demonstrate an understanding of the connection between differentiability and continuity of a function
- Apply Rolle's Theorem and the Mean Value Theorem to a function on a closed interval.
- Use differentials with linear approximation problems.
- Find an approximate solution to an equation using Newton's Method. (optional*)
- Determine whether a function is continuous or discontinuous at a point.
- Apply the Intermediate Value Theorem to a continuous function on a closed interval.
- Apply the method of logarithmic differentiation for finding derivatives.
- Solve exponential growth and decay problems. (optional*)
- Identify indeterminate forms and use L'Hospital's Rule to evaluate limits.
- Apply analytic techniques to a function and its derivatives to solve curve sketching problems.
- Solve applied optimization problems.
- Use summation notation with Riemann sums and upper and lower sums.
- Use the formal definition of the definite integral to evaluate the integral of an algebraic function over a closed interval.

- Apply the basic rules of integration for finding anti-derivatives for algebraic and transcendental functions.
- Evaluate definite integrals using the properties of integrals and the Fundamental Theorem of Calculus.
- Integrate indefinite and definite integrals using change of variable techniques.
- Use integration and analysis techniques to find the area of a region between two curves.