J. Sargeant Reynolds Community College
Course Content Summary

Course Prefix and Number: MTH 263   Credits: 3

Course Title: Calculus I

Course Description

Presents concepts of limits, derivatives, differentiation of various types of functions and use of differentiation rules, application of differentiation, antiderivatives, integrals and applications of integration. This is a Passport and UCGS transfer course. Prerequisite: Placement into MTH 263 or completion of MTH 167 or MTH 161/162 or equivalent with a grade of C or better. Lecture 4 hours. Total 4 hours per week. 4 credits

General Course Purpose

The general purpose of this first course in a three course sequence is to prepare students for further study in calculus with analytic geometry by providing them with the necessary competencies in finding limits, differentiation and integration.

Course Prerequisites/Corequisites

Prerequisite: Completion of MTH 167 or MTH 161/162 or equivalent with a grade of C or better.

Course Objectives
Upon completing the course, the student will be able to:

Limits
  x   Differentiate between the limit and the value of a function at a point
  x   Find the limit of a function by numerical, graphical and analytic methods
  x   Apply Limit Laws
  x   Calculate one-sided limit of a function
  x   Prove the existence of a limit using precise definition of the limit
  x   Determine the continuity of a function
  x   Calculate Vertical and Horizontal asymptotes using limits
Derivatives and Differentiation Rules
  x   Define Derivatives and Rates of Change
  x   Compute derivatives of basic functions using the definition of the derivative
  x   Differentiate polynomial, rational, radical, exponential and logarithmic functions
  x   Find equation of a tangent line using derivative
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- x Sketch a curve for a given function
- x Apply rules of differentiation to solve optimization problems
- x Find antiderivatives for basic functions using knowledge of derivatives

Integrals
- x Relate areas to definite integrals using sigma notation, Riemann Sums, and limits. [Note: L'Hopital's Rule is in Calc II but may be used for instructional purposes here.]
- x Apply Fundamental Theorem of Calculus to find definite integrals and derivatives
- x Find indefinite integrals of polynomials and basic trigonometric and exponential function
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