November 10, 2004

Syllabus for Math 165 (Fall 1997)

Chapter 1 Some Basic Concepts

(1) Integers, Rational Numbers, Real Numbers

(2) Mathematical Induction

(3) Supremum and Infimum

(4) Absolute Values and The triangle Inequality

Chapter 2 Integral Calculus

(1) Functions

(2) Partitions and Step Functions

(3) Integral of Step Functions

(4) Upper and Lower Integrals

(5) The Concept of Integrable Functions

(6) Integrability of Piecewise Monotonic Functions

(7) Basic Propertities of Integrals

(8) Application of Integrals

(9) Trigonometric Functions

(10) Polar Coordinates

(11) Area and Volume

Chapter 3 Continuous Functions

(1) The Concept of Limit

(2) Basic Poperties of Limit

(3) The Concept of Continuity

(4) Basic Properties of Continuous Functions

(5) Bolzano's Theorem, Intermediate-Value Theorems and The Extreme-Value Theorem

(6) Integrability of Continuous Functions

Chapter 4 Differentiable Functions

(1) The Concept of Differentiability

(2) Derivative and Tangents

(3) Differentiability implies Continuity

(4) Basic Rules of Differentiation

(5) Chain Rule

(6) Applications: Maxima and Minima (First and Second Derivative Tests)

(7) The Mean-Value Theorem

Chapter 4 The relationship between Integration and Differentiation

(1) Primitive Functions

(2) The Fundamental Theorem of Calculus

(3) Techniques of Integrations (Substitution, by Parts, Partial Fractions

Chapter 5 Inverse Functions The Logarthmic and Exponential Functions, Inverse Trigonometric Functions

(1) Derivative of Inverse functions

(2) The Logarthmic and Exponential Functions

(3) TInverse Trigonometric Functions

(4) More on Differentiation and Integrations of Functions