Final Exam Outline

I. **Exam 1 Material: Vectors**

   A. Basics of Vectors (including Dot and Cross Products)

   B. Eigenvalues

II. **Exam 2 Material: Plane and Space Curves**

   A. Parametric Curves

   B. Arc Length

   C. Unit Tangents, Unit Normals, and Curvature

III. **Exam 3 Material: Functions of Several Variables**

   A. Limits and Continuity of Functions of Two or More Variables

   B. Partial Derivatives

   C. The Gradient and Directional Derivatives

   D. The Chain Rule

   E. Optimization in Several Variables

   F. Lagrange Multipliers

IV. **Exam 4 Material: Multiple Integrals**

   A. Double Integrals

   B. Triple Integrals

   C. Polar, Cylindrical, and Spherical Coordinates

V. **Exam 5 Material: Vector Calculus I**

   A. Line Integrals of Scalar and Vector-Valued Functions

   B. Path Independence, Conservative Vector Fields, and Potential Functions

   C. Green's Theorem (both circulation and flux forms)

VI. **New Material: Vector Calculus II**

   A. Parametric Surfaces of Scalar and Vector-Valued Functions

   B. Surface Integrals

   C. Divergence and Curl of a Vector Field

   D. Stokes' Theorem

   E. The Divergence Theorem