Exam Review #2  
Math 264  
Exam date 10/18/2000

Topics Covered: Sections 12.1-12.5, 12.7-12.9

- Functions of two and three variables
  - Domain and range.
  - Graphs and level curves of functions of two variables.
  - Level surfaces of functions of three variables.

- Limits and continuity
  - Definition of limit and properties.
  - Definition of continuity.
  - The two-path test for non-existence of limits.

- Partial derivatives
  - Definition and geometric interpretation.
  - Higher order partial derivatives.
  - The mixed derivative theorem.

- Differentiability and linearization
  - Continuous partial derivatives imply differentiability.
  - Linearization (tangent plane).
  - Error in the standard linear approximation.

- The chain rule

- Directional derivatives
  - Definition as a limit. Geometric interpretation.
  - Relation between gradient and directional derivatives.
  - Properties of directional derivatives: directions of maximum increase and decrease, direction of zero change (normal to gradient).
  - Gradient is normal to level surfaces.

- Optimization
  - Local maximum and minimum, saddle points.
  - First derivative test. Critical points.
  - Second derivative test.
  - Absolute extrema on closed bounded regions.

- Lagrange multipliers

Study Problems - Chapter 12


- p. 998–999: 2, 7, 9, 13, 21, 23 (additional problems).