

Math 20 Fall 2003
Final Exam Review Sheet

Please see the Midterm 1 and 2 Review Sheets (available on the course web site) for review notes on the linear algebra material included on the final. The review notes below cover the multivariable calculus material from Stewart's *Calculus: Concepts and Contexts* chapter 11.

Listed below are the tasks per section that you should be prepared to do on the final. To study for the final, review the homework problems assigned this semester and try the "additional exercises" for each section listed below.

Note that solutions to the odd problems listed below appear in the student solution manuals to Stewart's *Calculus: Concepts and Contexts* and *Multivariable Calculus: Concepts and Contexts*. Check with your friends in Math 21a to see if they have one of these solution manuals.

§11.1 *Functions of Several Variables*

- Find the domain of a function of several variables
- Sketch a contour map of a function of two variables showing several level curves
- Match a function of two variables with its graph and with its contour map
- *Additional Exercises: #5–11 odd, 17, 19*

§11.3 *Partial Derivatives*

- Interpret a first partial derivative as the slope of a tangent line
- Find the first and second partial derivatives of a given function
- *Additional Exercises: #3, 5, 13–19 odd, 25, 27, 47, 49*

§11.4 *Tangent Planes and Linear Approximations*

- Find an equation of the tangent plane to a given surface at a specified point
- Find the linear approximation of a function of two variables at a specified point
- *Additional Exercises: #1, 3, 9, 11, 15*

§11.6 *Directional Derivatives and the Gradient Vector*

- Find the directional derivative of a function of several variables at a given point in a given direction
- Find the gradient of a function of several variables
- Find the maximum rate of change of a function of several variables and the direction in which it occurs
- Make use of the relationship between the gradient and the level curves of a function of two variables
- *Additional Exercises: #1, 5–13 odd, 19, 21, 25, 30, 32*

§11.7 *Maximum and Minimum Values*

- Identify the critical points, local maximum and minimum values, and saddle points of a function of two variables
- Find the absolute maximum and minimum values of a function of two variables on a given domain
- *Additional Exercises: #1–11 odd, 23, 25, 27, 31, 35*

§11.8 *Lagrange Multipliers*

- Use Lagrange multipliers to find the maximum and minimum values of a function of several variables subject to a given constraint or on a given domain
- *Additional Exercises: #1–9 odd, 19*