Chapter 13 Functions of Several Variables

Chapter Summary

13.1

- Understand the notation for a function of several variables.
- Sketch the graph of a function of two variables.
- Sketch level curves for a function of two variables.
- Sketch level surfaces for a function of three variables.
- Use computer graphics to sketch the graph of a function of two variables.

13.2

- Understand the definition of as neighborhood in the plane.
- Understand the definition of the limit of a function of two variables.
- Extend the concept of continuity to a function of two variables.
- Extend the concept of continuity to a function of three variables.

13.3

- Find and use partial derivatives of a function of two variables.
- Find and use partial derivatives of a function of three or more variables.
- Find higher-order partial derivatives of a function of two or three variables.

13.4

- Understand the concepts of increments and differentials.
- Extend the concept of differentiability to a function of two variables.
- Use a differential as an approximation.

13.5

- Use the Chain Rules for functions of several variables.
- Find partial derivatives implicitly.

13.6

- Find and use directional derivatives of a function of two variables.
- Find the gradient if a function of two variables.
- Use the gradient of a function of two variables in applications.
- Find directional derivatives and gradients of functions of three variables.

13.7

- Find equations of tangent planes and normal lines to surfaces.
- Find the angle of inclination of a plane in space.
- Compare the gradients $\nabla f(x, y)$ and $\nabla f(x, y, z)$.

13.8

- Find absolute and relative extrema of a function of two variables.
- Use the Second Partials Test to find relative extrema of a function of two variables.

13.9

- Solve optimization problems involving functions of several variables.
- Use the method of least squares.

13.10

- Understand the method of Lagrange Multipliers.
- Use Lagrange Multipliers to solve constrained optimization problems.
- Use the method of Lagrange Multipliers with two constraints.