Chapter 15 Vector Analysis

Chapter Summary

15.1

- Understand the concept of a vector field.
- Determine whether a vector field is conservative.
- Find the curl of a vector field.
- Find the divergence of a vector field.

15.2

- Understand and use the concept of a piecewise smooth curve.
- Write and evaluate a line integral.
- Write and evaluate a line integral of a vector field.
- Write and evaluate a line integral in a differential form.

15.3

- Understand the use of the Fundamental Theorem of Line Integrals.
- Understand the concept of independence of path.
- Understand the concept of conservation of energy.

15.4

- Use Green's Theorem to evaluate a line integral.
- Use alternative forms of Green's Theorem.

15.5

- Understand the definition of and sketch a parametric surface.
- Find a set of parametric equations to represent a surface.
- Find a normal vector and a tangent plane to a parametric surface.
- Find the area of a parametric surface.

15.6

- Evaluate a surface integral as a double integral.
- Evaluate a surface integral for a parametric surface.
- Determine the orientation of a surface.
- Understand the concept of a flux integral.

15.7

- Understand and use the Divergence Theorem.
- Use the Divergence Theorem to calculate flux.

15.8

- Understand and use Stoke's Theorem.
- Use curl to analyze the motion of a rotating liquid.