

## Final Exam Topics

The final exam is on Wednesday, August 20th, 6:05-9:05 in the usual classroom (Dunn 304). Calculators are not permitted.

You will be expected to be able to state the following theorems:

- Fubini's theorem for double integrals.
- Formula for the change of variables for double and/or triple integrals.
- Fundamental Theorem for line integrals.
- Green's Theorem.
- Stokes' Theorem.
- Divergence Theorem.

You will also be expected to be able to do the following:

1. All midterm topics with the exception of: (a) estimating integrals, (b) centre of mass calculations.
2. Vector Calculus:
  - Calculate curl and div of vector fields, and know when a vector field in 3 dimensions is conservative.
  - Calculate surface area and surface integrals.
  - Calculate the flow of a vector field across a surface.
  - Apply Stokes' and Divergence theorems (be sure to be able to recognize when these theorems are needed).
3. Second-Order Differential Equations.
  - Find the solutions of homogenous linear equations ( $g(x) = 0$ , all coefficients constant).
  - Use the methods of undetermined coefficients and/or variation of parameters to solve non-homogenous linear DEs.
  - Solve initial value problems for any of the above DEs.

- Note: Series solutions DEs will not be on the final exam.

Practice problems in each section are on the website:

<http://www.mathstat.dal.ca/~cruttw/Math2002.htm>