

## Math 251 Exam 2 information

- The Exam is scheduled as April 14 and it will be given during the regular class time.
- The exam covers sections 12.7-14.4 (section 12.7 the only part that wasn't included in Exam 1, i.e. absolute extremum)
- It is advised that you
  - read over the lecture notes;
  - work the quizzes;
  - work the suggested and webassign homework problems.
  - solve the Extra Practice problems (remember that it doesn't cover all the material and it is not sufficient to solve only it before the test);
- Concepts to know:
  - Absolute maximum and minimum values, extreme values theorem for functions of two variables (12.7)
  - Double integral over a rectangle, iterated integral and Fubini Theorem (13.2)
  - Evaluating double integrals, regions of types I and II. (13.3).
  - Volume, properties of double integrals (13.3)
  - Polar coordinates, conversion from rectangular to polar coordinates in a double integral (13.4-13.5)
  - Mass and center of mass of a lamina (13.6)
  - Triple integral, solid regions of types I, II and III
  - Volume and mass of a solid region (13.8)
  - Cylindrical coordinates (13.9)
  - Triple integral in cylindrical coordinates (13.10)
  - Spherical coordinates (13.9)
  - Triple integral in spherical coordinates (13.10)
  - Line integral of a scalar function, mass of a thin wire with given linear density (14.2)
  - Line integral of vector field (14.2)
  - Work done by a force field (14.2)
  - Conservative vector field, potential function (definition and how to find). (14.3)
  - Fundamental Theorem of Calculus (14.3)
  - Green's Theorem (14.4)
  - Independence of path (14.3)
- Formulas sheet you may use during the test (will be typed on the title page of the test):

$$x = \rho \sin \phi \cos \theta, \quad y = \rho \sin \phi \sin \theta, \quad z = \rho \cos \phi$$

$$\oint_{\partial D} P dx + Q dy = \iint_D \left( \frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) dA$$

$$\bar{x} = \frac{\iint_D x \rho(x, y) dA}{m}, \quad \bar{y} = \frac{\iint_D y \rho(x, y) dA}{m}$$