

MATH 251 section 502, Content of TEST #3, Fall 2010

Calculators are OK, but not necessary. There will be 10 problems of equal weight 5 pts for a maximal score 50 pts. For full credit you need to show the whole work.

The problems are aimed to test your knowledge (definitions, the main theorems), understanding of the material (main mathematical ideas and techniques) and some basic applications.

The test will be based on the basic material of your textbook and your homework assignments, it will cover the Section 14.1 - 14.9. You should be able to state important theorems like Fundamental Theorem for Line Integrals, Green's Theorem, Stokes' Theorem, and Divergence Theorem (do not forget the "fine print" !!!). The problems will cover the following material:

1. Vector fields in 3-D, conservative vector fields.
2. Line integrals of functions (of two and three variables) and application to mass.
3. Line integrals of vector fields (end of section 14.2) and applications.
4. Line integrals of conservative vector fields, independence of the path. Criterion for a vector field to be conservative. **Fundamental Theorem** for line integrals. All these are **must** (in particular finding a potential of a given conservative vector field).
5. Green's Theorem and applications (this is an absolute **must**).
6. Differential operators over vector fields, **curl**, **grad**, and **div**, and their properties.
7. Parametric surfaces and their area.
8. Surface integrals of scalar functions. Surface integrals of vector fields (**a must** !)
9. Surface integrals of vector fields and application (an absolute **must**).
10. Stokes' Theorem and applications **a must**.
11. The Divergence Theorem (section 14.9)
12. Good luck