**Test 3: Vector Calculus**

**Multivariable Calculus**

**Course Objectives**: *The student will be able to …* apply Green’s Theorem, evaluate line and surface integrals, calculate curl and divergence.

Below are a few comments/questions meant to highlight or clarify key points

1. Sections covered: 16.1 – 16.7.
2. Regarding length – the test will be between 6 and 10 questions in length.
3. Non-symbolic graphing calculators are acceptable. Bring your own or borrow one from me.
4. What are the named theorems (someone’s name attached)?
5. It is unlikely that I will ask you to graph a vector field. However, I might give a vector field and then ask you to work from it.
6. Key skill: Parametrization
7. You should be able to set up and evaluate integrals for work, flux, and surface integrals.
8. Key concept: conservative vector fields
   1. What are they?
   2. What are they good for?
   3. When are they helpful?
9. Big deal: Green’s Theorem
10. Regarding div and curl, I would hope that you would have a basic intuition.
11. Practice materials: In addition to the text, class notes, and your homework …
    1. Make sure you go over last year’s exam as well as the quiz.
    2. The Stewart review problems.
    3. The MIT videos if you need additional instruction.
12. If, evaluate  along the curve *C*:  where .
13. Evaluate , where *C* is the triangle from  to  to  to .
14. For , find the curl and the divergence of . Is  conservative? If so, find the function *f* such that .
15. Find the area of the part of the surface , that lies above the triangle with vertices , , and .
16. Find the flux of  across the part of the cylinder  that lies between the planes  and  with upward orientation (this is an example from my notes).