THE FINAL

(1) Everything that we have done is on the final.

(2) Look at all the tests and the quizzes. Make sure you understand the problems and know how to solve them. If not read the corresponding section in the book.

(3) Read the postings on my page on what we did in class. REMEMBER

* 16.1, 16.2, 16.4 (and we did in fact talk about 16.3) are on the test.

* line integrals: what is $ds = ?$

* what does $\int_C P dx + Q dy$ mean?

* The formula
$$\int_C P dx + Q dy = \iint_A \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) dA$$

in Green's theorem will be given, but without explaination.

(3) Important material. Do the problems.

* limits. How to use polar coordinates
* continuous functions.
* Partial derivatives. Also higher order partial derivatives and partial derivatives of functions defined implicitly.

* The chain rule.

* Directional derivatives, $D_{\vec{u}} f(\vec{x}) = \nabla f(\vec{x}) \cdot \vec{u}$.

Remember:

- $\vec{u}$ has to be of length 1
- If not you have to replace it by

$$\vec{u} = \frac{\vec{v}}{|\vec{v}|}.$$

- How do you find $\vec{u}$ if the information is: "in the direction from the point P to the point Q"

* How do you find the equation of the tangent plane of a surface
  - * $z = f(x,y)$
  - * $F(x,y,z) = 0$?

* How do you find local min/max values? How do you find saddle points? How do you find absolut min/max values given a constrain $g(x,y) = 0$ $(g(x,y,z) = 0)$? What are

Lagrange multipliers?

* Note: There will be no problems with two constrains!

* You have to be able to
- Set up and } look at test #3
- evaluate
  integrals of two and three variables.

* You have to know how to use
- polar coordinates and
- cylindrical coordinates

→ There will not be a problem involving
- spherical coordinates
- Momentums
- Center of mass
- probability