FINAL EXAM INFORMATION– MATH 1260
FALL 2014

EXAM ON 12/18/14 AT 8:00AM

There will be 4 pages of questions.

(a) The first two pages will contain about 6-10 short answer questions each (true or false/fill in the blank/quickly compute/etc). I can ask about recent stuff (like the Inverse Function Theorem or Implicit Function Theorem, compactness, connectedness, open and closed sets, continuity). I can ask about all the interations of multiple integrals (surface areas, flux integrals, line integrals, volume, center of mass, Stokes Theorem, Green's Theorem, Divgergence Theorem, etc). I can ask about finding maxes and mins, gradiants (and their meanings), parameterizing curves (including by arc length), vectors (scalar projections, vector projections, projecting onto planes). Other topics as well are of course possible.

(b) There will be a page where I ask you to do a computation with vectors (although maybe a vector coming from a gradient or curl).

(c) There will be a problem involving a max or min or lagrange multiplier.

(d) There will be a flux integral problem (as usual, you might have to use Stokes/Greens/Divergence theorem).

(e) I will ask you to prove one of the following:

   i. Prove that the image of a compact set under a continuous function is compact.

   ii. Prove the Heine Borel theorem.

   iii. Prove that if $f : \mathbb{R}^n \longrightarrow \mathbb{R}^n$ is a continuously differentiable such that $\det(\mathrm{Jac}_f)(\vec{a}) \neq 0$ for all $\vec{a} \in \mathbb{R}^n$. Then if $W \subseteq \mathbb{R}^n$ is an open set, then $f(W)$ is also open. (This was a homework problem).

   iv. Show that if $f : \mathbb{R}^n \longrightarrow \mathbb{R}^n$ is continuous and $W \subseteq \mathbb{R}^n$ is connected, the $f(W)$ is also connected.

(f) There will an extra credit problem based on the newer material (out of Spivak).