MATH 249

Today

1. Review for Exam

Exam Review

1. Double/Triple integrals
   (a) Definition and meaning
2. Iterated integrals
   (a) Fubini's Theorem
   (b) General regions
   (c) Polar coordinates
   (d) Cylindrical/spherical coordinates
3. General changes of variable and the Jacobian
4. Integrand of 1
5. Vector fields
   (a) Conservative vector fields
   (b) Potential functions
6. Path/Line integrals
   (a) Scalar functions
   (b) Vector fields
   (c) $ds, dx, dy, d\vec{r}$
   (d) FTCLI
7. Independence of path (for conservative vector fields)
8. Test for Conservatism (open, simply connected region, $\vec{F} =< P, Q >$ with P and Q having continuous partials, and $Q_x = P_y$).

Logistics

1. We can start 5 minutes early and run 5 minutes late (9:05-10:15).
2. The exam is intended to be a 50-minute exam.
3. You may use a calculator or Python, but I will ask you explicitly to perform some computations by hand. You may also use CalcPlot.
4. For Python, you may start with the basic template I've posted. You may also bring your Python info sheet. You may only use Python if you have passed the calculus gateway quiz.
5. Problems will be on one page. I will provide blank paper for you to work on. Please leave the upper left corner blank (for a staple) and write on only one side of the page.
6. Some integrals will have you stop after setting them up. For each "set up" problem, use the coordinate system in which you would carry out the integration. (Your score depends on your choice!) You do not need to simplify your integrands, but you should not stop until the **next** step would be integration. (For example, if the integrand involves a dot product, you need to compute the dot product.)

Next Time

1. Exam 3
2. Watch 16.4 [$\sim$52 minutes] for after exam.