Review for Exam 1

Math 2423

February 16, 2016

- Section 4.1, 4.2: You should be able to write down the definition of the definite integral of an arbitrary function $f(x)$. In class we introduced a way of calculating integrals "from scratch" without invoking antiderivatives. For instance, some "basic functions", such as the linear function and quadratic function, should be easy to integrate using the definition of Riemann sums.

- Section 4.3: The first part of the Fundamental Theorem of Calculus takes the derivative of a function that is given by an integral. Another variation of this problem is to make the upper and lower limits as functions of x, which is really a chain rule problem.

  The second part of the Fundamental Theorem of Calculus is more likely to be combined with the u-substitution in Section 4.5. In other words, you will be taking the integral of a function using the antiderivatives.

- Section 4.4: This section is mainly about why we invented the notation for indefinite integrals(i.e. antiderivatives) similar to the notation we use for definite integrals.

- Section 4.5: The u-substitution problems appear in different nature. One key idea in finding the proper u-sub is to find a "block" that is nether too trivial nor too ambitious. There is sometimes a constant floating around after you make the u-substitution, and it takes some thinking whether you should divide or multiply by the constant you get. A common way to avoid error(which is what I see in HWs,) is to solve for $\mathrm{d}x$ and plug it back into the integral.

  Two or three problems we did in class took advantage of the fact that you can go back to the substitution and solve for x if needed.

- Section 5.1: The area between two curves is the generalization of the area under a curve. You won't be asked to sketch the curves, but there is an algebraic way of figuring out the intersection points without using a calculator (calculators won't be allowed during the test.)

- Section 5.2: Of course, calculating the volume of solids of revolution is a key topic in this course. We covered the disc/washer method pretty ahead of time, so this section will be included in the exam.