Math 212 Quiz # 2 Review sheet of goodness!

March Madness

March 11, 2010

1. Section 5.1: The Natural Logarithmic function, differentiation. This section, along with most of the others in Chapter 5, is really just a review of a basic function that has a funny definition. We will move rather quickly through these sections, and Corey will be sure to highlight the things you’ll need to know. For instance, know the basic properties of the logarithm function, and its derivative. For this section, it’s that simple.

2. Section 5.2: The natural logarithmic function, integration. For this section, you’ll need to know, basically, the opposite of section 5.1. That is, there are A LOT of functions out there whose antiderivatives have to do with the natural logarithm. This section just explores how exactly the natural logarithm rears its ugly head, in particular, how the substitution rule can be involved with this process. The examples in class and the homework are great problems to study.

3. Section 5.3: Inverse functions. This section is a good section for you all. See, it’s one of those sections where Corey really doesn’t want to ask much about, but some of the future development of the class depends on the information contained therein. Really, for this class, there are three important things to remember from this section. First, inverse functions need not always exist, but almost all the time you and I could make the domain a little smaller so that said function does have an inverse. Second, you should know how to find an inverse, should it exist. Of course, lots of times functions’ inverses are difficult to find, and Corey wouldn’t ask you about anything like that. But knowing the process is important (do be careful to keep in mind the domains in question are very important!) Third, and finally, the whole point of this section is to provide a method for finding derivatives of functions whose definitions are as inverse functions. The best and first example is the exponential function $e^x$. As we defined it, it’s the inverse of the ln function. Armed with only that information we are somehow able to find its derivative. I would suggest you know that derivative (Hint: $(e^x)' = e^x$). Then, learn the corresponding integral formula, and work the heck out of it (translation: be able to answer the kinds of problems we learned about before (from this class and math 211), but with regards to the new functions we’re learning.
about). See problems 33-64 of section 5.4 for examples of that. More specifically, though, when looking at the homework, focus your efforts on the ones that Corey has assigned – after all, it seems like he spent a lot of time figuring out exactly what questions to ask you, so it’s likely he’d ask quiz and exam questions that are similar to those. He doesn’t want to waste your time.

4. Section 5.4: Exponential functions, derivatives and integrals. In this section, all we learn is that \( \frac{d}{dx} e^x = e^x \), and \( \int e^x \, dx = e^x + C \). We sort of already knew that. Remember, though, that’s all these questions are, maybe with substitution thrown in (if you’re integrating). It’s the same process with different functions involved. You know how to do these questions already, just include the new info regarding derivatives and integrals of these new functions into your brain and you’ll be able to do them.

5. Section 5.5: Bases other than \( e \). Same material except with considering the function \( f(x) = a^x \) where \( a \) is any number, \( a > 0 \).

6. Sections 5.6 and 5.7: Inverse Trig functions and their derivatives and integrals. These sections introduce inverse trig functions, their domains, and their derivatives and integrals. And so this is exactly what you’d need to know! I would know how to differentiate these sorts of functions (along with their various other forms that you’d need to use the chain rule for). In addition, I would know how to spot what sorts of integrals look as though they would be integrated with an inverse trig functions. We spoke at length about this in class, and the homework is excellent practice.

7. Section 8.2: Integration by parts: In this section we learned how to “undo” the product rule. Unlike our other processes, though, we really just learn how to change one integral into another (with some change left over), and hopefully be able to compute the integral left over. All of the homework questions are great practice for the quiz.

8. General information: This quiz will be a lot of fun, for sure! I’d say that there will be a bit of integration on the quiz, and that practicing questions from Section 8.1 would be great practice. See, that section just compiles a bunch of integrals and it doesn’t tell you what method to use (substitution, completing the square for a trig integral, etc.). Of course, those questions don’t have any practice with integration by parts. Indeed, there will be questions on that, but also questions about derivatives and other issues from Chapter 5, as outlined above. So good luck, and rock on!!!!!!