

Math 213 Midterm # 1 review!

The Joker

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Here is some important information regarding the exam coming up!!! HAHHAHAHAHAHAHAHAHAHAHAHAHAHAHA!

1. Section 9.5: The alternating series test. This section studied a new sort of series, called an *alternating series*. It's the first series we've studied where the terms could be positive or negative, and that we would develop a test to determine *convergence* (recall that the test for divergence would consider series of all sorts, but the only conclusion one can draw from that test would be that of divergence). There are other sorts of tests for more general series, but for now, we learned the alternating series test. I would know how to apply this test, and know the difference between absolute convergence and conditional convergence, and the exam will likely ask you to demonstrate that you know the difference.
2. Section 9.6: The ratio and root tests. This section was great because it really helps us to determine absolute convergence of an arbitrary series. It's difficult to say how many series this test would actually apply to... we've developed a lot of tests so far, and so really the choice to use or not use either or these tests may just be a preference of yours. For example, the test for divergence would show that most series diverge (although Corey would likely ask you questions where the test for divergence doesn't apply), and the ratio test could also show that. In any event, I would know that the ratio test's only conclusions are that a series absolutely converges, or diverges (or the test may be inconclusive). So under no circumstances would you conclude that, based only on the root or ratio tests, that a series conditionally converges. Further, Corey finds the ratio test much more interesting than the root test, and feels that it's much more likely that you would use the ratio test on an exam.
3. Section 9.7: Taylor and Maclaurin Polynomials. This section introduced us to the idea that an indeterminate inside of an infinite sum could represent a function. In particular, functions which were "infinitely long" polynomials were of particular interest, and these were what we called power series. The terms Taylor Series and Maclaurin series are used as one entertains the idea that a center could be chosen to be nonzero, or zero (respectively). So what one wants to know from this section is how to construct a Taylor (or Maclaurin) series to whatever degree

is asked for. So I suggest that you study problems 13–24 from this section, as they may be good practice.

4. Other suggestions. Please take a look at the homework problems 51–68 in section 9.6, as it is just a collection of series that are there for you to determine the sort of convergence or divergence, just like the test would do. So I strongly suggest that you consider those problems as good practice problems. In addition, Corey will also likely ask you to produce a Taylor (or Maclaurin) polynomial for a given function out to a given degree about a given center. So, as I say above, see homework 13–24 in Section 9.7. Otherwise, **ROCK ON!**