

MA 2560: Calculus II (Fall 2009) Review for Final Exam

The Final Exam is cumulative, which means that any material that we have covered this semester is fair game. Questions on material covered on the first three exams will be similar in nature to the questions asked on those exams. In fact, you may see some of the same questions again. You are also responsible for the material covered since the last exam: Sections 12.2, 12.5, 12.6, 12.8, and 12.10. You may bring one **8.5 inch by 11 inch cheat sheet** with you to the exam.

The Final Exam will take place on **Monday, December 14** at 8:00–10:30AM. The Final Exam is worth 20% of your final grade.

Topics

To be successful on the material covered since Exam 3, you should

- understand the notation of series
- understand what the sequence of partial sums is for a given series and be able to find its limit in reasonable situations (in particular, know how to find the limit of the sequence of partial sums for a telescoping series)
- understand what it means for a series to converge/diverge
- know what a geometric series is, when it converges/diverges, and what it converges to if it converges
- know what the harmonic series is and that it diverges
- know the Test for Divergence and be able to apply it appropriately
- know the Integral Test and be able to apply it appropriately
- know what a p -series is and when it converges/diverges
- know the Direct Comparison Test and be able to apply it appropriately
- know the Limit Comparison Test and be able to apply it appropriately
- know the Alternating Series Test and be able to apply it appropriately
- know what the alternating harmonic series is and that it is an example of a conditionally convergent series
- know what it means for a series to be absolutely convergent
- know what it means for a series to be conditionally convergent
- be able to provide an example of a series that is conditionally convergent
- know the Ratio Test and be able to apply it appropriately
- know what a power series is and be able to determine its radius and interval of convergence
- know what a Taylor/Maclaurin series is and be able to find one (both using the definition and by using known Taylor/Maclaurin series)
- be able to approximate functions and integrals using Taylor polynomials

Words of advice

Here are some things to keep in mind when taking the exam:

- Show all work! The thought process and your ability to show *how* and *why* you arrived at your answer is more important to me than the answer itself. For example, if you have the right answer, but your reasoning is flawed, then you will lose most of the points.
- The exam will be designed so that you could complete it without a graphing calculator. If you find yourself using your calculator a lot on a given question, then you may be doing something wrong.
- Make sure you have answered the question that you were asked. Also, ask yourself if your answer makes sense.
- If you know you made a mistake, but you can't find it, explain to me why you think you made a mistake and tell me where the mistake might be. This shows that you have a good understanding of the problem.
- If you write down an “=” sign, then you better be sure that the two expressions on either side are equal. Similarly, if two things are equal and it is necessary that they be equal to make your conclusion, then you better use “=.”
- Don't forget to write limits, integral symbols, $+C$, dx , etc. where they are needed.
- Both of us should be able to read what you wrote. Your work should be neat and organized! In general, your work should flow from left to right and then top to bottom (just like if you were reading). Don't make me wander around the page trying to follow your work.
- If your answer is not an entire paragraph (and sometimes it may be), then your answer should be clearly marked.
- Ask questions when you are confused. I will not give away answers, but if you are confused about the wording of a question or whether you have shown sufficient work, then ask me.

Exercises

Try some of these problems. You do not necessarily need to do all of them. You should do the ones that you think you need more practice on. I'm hoping that you will talk amongst each other to determine if you are doing them correctly. Of course, if you have questions, then I will answer them. Lastly, if a concept appears in multiple questions, you should not necessarily take that to mean that that concept is somehow more important than ones that do not appear frequently.

1. Exercise 9, page 730
2. Exercise 17, page 730
3. Exercise 35, page 730
4. Do as many of the exercises on page 758 as you'd like. This will give you practice on deciding what test to use. In fact, you may benefit from reading Section 12.7 (it's very short and reinforces all of the things that I've been saying in class). **Note:** on the exam, you will be asked to state what test you are using. Also, you really do need to verify all of the necessary hypotheses.
5. Exercise 3, page 755

6. Exercise 4, page 755
7. Exercise 5, page 755
8. Exercise 27, page 756
9. Exercise 3, page 763
10. Exercise 7, page 763
11. Exercise 15, page 763
12. Exercise 15, page 763
13. Exercise 27, page 763
14. Exercise 30, page 763
15. Exercise 9, page 782
16. Exercise 17, page 782
17. Exercise 29, page 782
18. Exercise 33, page 782
19. Exercise 47, page 783
20. Exercise 54 (use a 5th degree polynomial; ignore the error restriction), page 783
21. Exercise 63, page 783
22. Exercise 67, page 783