MA 2560: Calculus II (Spring 2010)
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 12.1–12.6, 12.8–12.10.

You may bring one **8.5 inch by 11 inch cheat sheet** with you to the exam. Unlike previous exams, I will *not* provide you with any integral formulas.

The Final Exam will take place on **Tuesday, May 18** at 11:00–1:30PM. The Final Exam is worth 20% of your final grade.

Topics

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

- know the definition of a sequence
- understand the notation of sequences
- be able to find the limit of a sequence
- understand what increasing, decreasing, monotone, and bounded sequences are and be able to determine whether a given sequence has one of these properties
- know statement of and understand the Monotonic Sequence Theorem
- 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

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- 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 a few 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. On the other hand, if you have the wrong answer because of a silly computational mistake, but have shown that you have an understanding of the material being tested, then you will receive most of the points.
- I will be grading the justification of your answer, not just the answer. So, you must use proper notation and make appropriate conclusions.
- 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, $+C$, etc. where they are needed. This goes along with using proper notation and making appropriate conclusions.
- 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 1, page 730
2. Exercise 5, page 720
3. Exercise 13, page 720
4. Exercise 19, page 721
5. Exercise 29, page 721
6. Exercise 42, page 721
7. Exercise 9, page 730
8. Exercise 17, page 730
9. Exercise 35, page 730
10. 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.
11. Exercise 3, page 755
12. Exercise 4, page 755
13. Exercise 5, page 755
14. Exercise 27, page 756
15. Exercise 3, page 763
16. Exercise 7, page 763
17. Exercise 15, page 763
18. Exercise 15, page 763
19. Exercise 27, page 763
20. Exercise 30, page 763
21. Exercise 15, page 769
22. Exercise 23, page 769
23. Exercise 9, page 782
24. Exercise 17, page 782

25. Exercise 29, page 782
26. Exercise 33, page 782
27. Exercise 47, page 783
28. Exercise 54 (use a 5th degree polynomial; ignore the error restriction), page 783
29. Exercise 63, page 783
30. Exercise 67, page 783

