

Math 2300: Calculus II, Fall 2005; Instructor: Dana Ernst

Review for Midterm Exam 3

Here is a review for your upcoming exam. The exam covers sections 10.2-10.8. I will not collect this. Do what you want with it. This review will give you a good indication of what you will be expected to know for the exam.

The following is a list of topics that you should know and understand.

- What is a sequence?
- Be able to find a formula for the n th term of a given sequence.
- Be able to determine whether a give sequence converges or diverges. If a sequence converges, be able to determine its limit.
- What is a series? Be able to identify different types of series: Geometric Series, p -series (including the Harmonic Series), Alternating Series (including Alternating Harmonic Series).
- What is the sequence of partial sums associated to a given series? What is the relationship between the sequence of partial sums and the series?
- When does a geometric series converge? If it converges, what is its sum?
- When does a p -series converge?
- What does it mean for a series to be absolutely convergent? Conditionally convergent? Know some examples of each.
- You should be able to apply the following Theorems and Tests to determine whether a given series converges. In each case, you should memorize the hypotheses and conclusions. Be sure to know when each test is inconclusive.
 1. n th Term Test
 2. Direct Comparison Test
 3. Limit Comparison Test
 4. Alternating Series Test
 5. Integral Test
 6. Absolute Convergence Theorem
 7. Ratio Test
 8. Root Test
- What is a Taylor polynomial? What is Taylor's Formula? What is a Taylor Series? Be able to find each of these for a given function. Which of these is an approximation for the given function?
- What is a power series? What is the radius of convergence for a power series? Be able to find it. What is the interval of convergence for a power series? Be able to find it.

- Be able to find power series representations using substitution, differentiation, or integration of known power series.
- If a series converges, we rarely find its sum. In what cases can we find the sum?

Here are some problems to work on. There's a lot here, but try to do as many as you can.

- **Sequence Stuff:** Determine whether each of the following sequences converges or diverges. If the sequence converges, find its limit.

Pages 691-692: #9, 11, 13, 15, 29, 31, 33, 45, 59

- **Series Stuff:** Determine whether each of the following series converges or diverges. If the series has negative terms, and it converges, state whether the series converges absolutely or conditionally.

Page 701: #23, 25, 35

Page 723: #13, 23, 29

Page 729: #3, 13, 15, 21, 31

Page 737: #3, 7, 9, 21, 23, 25, 27, 31, 39

- **Taylor Stuff:** Take a look at the following problems.

Page 715: #3, 19, 33

- **Power Series Stuff:** This should be fresh in your head, so look over your homework problems from Section 10.8.

Other suggestions: Look over your homework assignments! Also, spend some time quizzing yourself on when you should use each convergence test. Also, make sure that you know when each one is inconclusive. Lastly, don't forget, for Dana's section:

Midterm Exam 3: Wednesday, November 9th, 5:15–6:45 PM, MUEN E0046