Exam 3 Notes

The third exam will cover sections 3.8, and 5.1-5.6, and 6.1-6.2. To help you remember the convergence/divergence tests, the "hint sheet" will be available to you during the exam.

Here are the main points from this material:

1. (3.8) Know how to compute an improper integral (including taking the limit).
2. Know these definitions: A sequence, series, power series. Absolute and conditional convergence, radius of convergence, interval of convergence.
3. Be able to determine if a **sequence** converges or diverges. This means that we can find the limit. The main techniques we reviewed were:
   (a) L'Hospital's Rule (and the algebra needed to get into a form suitable for l'Hospital)
   (b) Divide by a power of n

   NOTE: You can use your intuition so that you know what you're trying to get, but for full credit, you must back up your answer with a valid technique, as one of the two listed above.
4. Be able to explain what an infinite series is (Hint: Think about partial sums converging).
5. Template series (**be sure you know these**): The geometric series (and the sum of the geometric series), the $p-$series, and in particular the harmonic series and the alternating harmonic series.
6. Be able to determine if a series converges or diverges:
   (a) Test for Divergence.
   (b) The integral test (for certain functions).
   (c) (For positive series or abs conv) The (direct or limit) comparison test.
   (d) (For abs convergence) The Ratio Test
   (e) (For abs convergence) The Root test (not a common test)
   (f) The Alternating Series Test and the remainder estimate for an alternating series, R_n:
   $$|R_n| \leq b_{n+1}$$

   NOTE: You can use your intuition so that you know what you're trying to get, but for full credit, you must back up your answer with a valid test.
7. Find the radius and interval of convergence for a given power series. Understand the three possible outcomes for the radius (one point, an interval about $x = a$, all real numbers).
8. Construct a power series for a given function using a geometric series as a template. Be able to differentiate and integrate a power series.