Math 262
Exam 4 Review Sheet

Section 11.1 Sequences

- Understand the definition of a sequence, and the notation used to represent sequences and their terms.
- Understand what it means for a sequence to be convergent and what it means for a sequence to be divergent.
- Be able to use limits to investigate the convergence/divergence of sequences.
- Know the definition of a monotone sequence and the definition of a bounded sequence. Recall the fact that every bounded monotonic sequence has a limit.
- Be able to use the sandwich theorem to show that a sequence has a limit.

Section 11.2 Convergent or Divergent Series

- Understand the definition of an infinite series and the notation used to represent series and their terms.
- Understand and be able to distinguish between the two sequences associated with a given series: the sequences of terms $\{a_n\}$ and the sequence of partial sums $\{S_n\}$.
- Know how to determine whether a telescoping series converges or diverges and when it converges, find its sum.
- Know how to determine whether a geometric series converges or diverges and when it converges, find its sum.
- Understand the proof that the harmonic series diverges.
- Understand and be able to apply the nth term test show that a given series diverges. Also remember that this test **cannot** be used to show that a series converges.
- Understand and be able to apply the theorems about series that are *eventually equal*, and about the effects of addition, subtraction, and scalar multiplication on convergent and divergent series.

Section 11.3 Positive Term Series

- Understand the definition of a positive term series.
- Understand and be able to apply the Integral Test to investigate the convergence/divergence of a given series. In particular, remember to verify the hypotheses needed to use this test.
- Memorize the theorem on p-series and thus be able to determine whether a given p-series converges or diverges.
- Understand and be able to apply the Basic Comparison Test to investigate the convergence/divergence of a given series. In particular, remember to verify the inequalities needed to use this test.
- Understand and be able to apply the Limit Comparison Test to investigate the convergence/divergence of a given series. In particular, remember to conditions that allow us to detect convergence/divergence and those that lead this test to be inconclusive.

Section 11.4 The Ratio and Root Tests.

- Understand and be able to apply the Ratio Test to investigate the convergence/divergence of a given series. In particular, remember to conditions that allow us to detect convergence/divergence and those that lead this test to be inconclusive.
- Understand and be able to apply the Root Test to investigate the convergence/divergence of a given series. In particular, remember to conditions that allow us to detect convergence/divergence and those that lead this test to be inconclusive.

Section 11.5 Alternating Series and Absolute Convergence

- Understand the definition of an alternating series.
- Understand and be able to apply the Alternating Series Test to investigate the convergence/divergence of an alternating series. In particular, remember to verify the hypotheses needed to use this test.
- Understand how we can use the proof of the alternating series test in order to find a bound on the error in approximating the sum of a convergent alternating series by looking at the $n+1$st term.
- Understand the definition of an absolutely convergent series and remember that if an alternating series is absolutely convergent, then it converges.
- Given an alternating series, be able to determine whether it converges absolutely, conditionally, or diverges.
- Be able to show that an alternating series is absolutely convergent by using the ratio test.