MATH 444
STUDY GUIDE
MIDTERM 2

The exam covers all of the material we have discussed, but will focus on the material from sections 3.3 to 5.4. Some important concepts include:

Ch. 3: Monotone sequence (increasing/decreasing/non-increasing/non-decreasing), lim sup and lim inf (Exercise 3.3.10), subsequence, Cauchy sequence, series, sequence of partial sums of a series, geometric series, p-series, (alternating) harmonic series
Ch. 4: Cluster point, Limit of $f(x)$ at a cluster point c
Ch 5: Continuous function at a point c, continuous function on a set A, bounded function, uniformly continuous function on a set A, ~~Lipschitz function~~

The following are some of the more important results from this part of the course, and you should be familiar with their statements:

Ch. 3: Monotone Convergence Theorem (3.3.2), Exercise 3.3.10, The limit of sequence $(1 + 1/n)^n$ (Example 3.3.6), Monotone Subsequence Theorem (3.4.7), Bolzano-Weierstrass Theorem (3.4.8), Cauchy Convergence Criterion (3.5.5), behavior of geometric series (Example 3.7.2(a)), nth Term Divergence Test (3.7.3), behavior of p-series, including harmonic series (Example 3.7.6), behavior of alternating harmonic series (3.7.6(f)), Comparison Tests (both 3.7.7 and 3.7.8)
Ch. 4: Sequential Criterion for limits (4.1.8), "Limit theorems" (4.2.4, 4.2.6,4.2.7)
Ch. 5: Sequential Criterion for continuity (5.1.3), Consequence of "Limit theorems" for continuous functions (5.2.1 and 5.2.2), compositions of continuous functions (5.2.6,5.2.7), Boundedness theorem (5.3.2), Max-Min Theorem (5.3.4), Intermediate Value Theorem (5.3.7), Uniform Continuity Theorem (5.4.3), Continuous Extension Theorem (5.4.8)

Some Suggested Exercises from the Text
3.3: 5, 11
3.4: 1, 3, 8(b)
3.5: 1, 3(a), 8
3.7: 1, 7, 9, 11
4.1: 1, 8, 9
4.2: 1, 2(b,c), 9, 12
5.1: 3, 4(a,b,d), 7, 8
5.2: 1(a,b), 4, 7, 12
5.3: 1, 4, 9

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5.4: 1, 3(a), 6