For Test 2 you should be familiar with all homework problems assigned in Chapter 2, and the extra homework problems handout from this week. Again for this test, some questions may be directly from the homework or variations of those problems, or I may ask about an aspect of some proof. In addition to the homework material, you should be familiar with the material outlined below.

# Definitions and Concepts

1. Definition of the limit of a sequence $\lim_{n\to\infty} x_n$ and what it means for a sequence to converge.
2. Definition of a monotone sequence.
3. Definition of a subsequence.
4. Definition of $\limsup_{n\to\infty} x_n$ and $\liminf_{n\to\infty} x_n$ .
5. Define what it means for a sequence to be Cauchy.
6. Define what it means for a series to converge absolutely, conditionally.
7. Definition of the limit of a function: $\lim_{x\to c} f(x)$ .

# Proofs and Exercises

1. For a particular sequence $\{x_n\}_{n=1}^{\infty}$, be able to determine $\lim_{n\to\infty} x_n$ and prove your result using the $\epsilon, M$ definition.
2. For a particular sequence $\{x_n\}_{n=1}^{\infty}$, be able to show that it is Cauchy using the definition.
3. Determine, with explanation, the lim sup and lim inf of a given sequence.
4. For a particular function, be able to determine $\lim_{x\to c} f(x)$ and prove your result using the $\epsilon, \delta$ definition..

# Theorems and Proofs

Know how to prove the following results:

1. A convergent sequence has a unique limit (Prop. 2.1.6). Note: not done in class.
2. Prop. 2.1.13. Note: not done in class.
3. A convergent sequence is bounded (Prop. 2.1.7).
4. Theorem 2.4.5: A sequence is Cauchy if and only if it converges.
5. If a series converges absolutely then it converges (Prop. 2.5.13).