The final exam is scheduled for Tuesday, 17 December 2012, at 10:30-12:30pm. I'm still waiting to hear if we'll have a room in addition to STSS 230; this will be announced on the Moodle page and via email as soon as I have any updates. At 120 minutes, the final is roughly 2.5 times the length of our 50 minute midterm exams. It covers Sections 1.1–1.4, 2.1–2.4, 3.1–3.5, 4.1–4.3, 8.1–8.2 and continuity but the exceptions from previous midterm and described in class all apply:

- In Section 3.2, you do not need to memorize the axioms definite an ordered field. You might think that means Section 3.2 won't appear on the exam at all; that's almost true, but recall that a few things (like exercises #6 and #7) turned out to be important throughout the rest of the semesters.
- The only thing you need to know from Section 3.5 is that a subset S of $\mathbb{R}$ is *compact* if and only if it is closed an bounded. Therefore any questions about compact sets are really questions about when a set is closed and/or bounded.
- You spent a fair amount of time on the Writing Project this semester, so you should expect to see something about continuity on the final exam. That does *not* mean you should memorize your entire Writing Project, however; as you know from your writeup, any such problem is really more about the convergence of sequences.
- Because Section 8.2 was not covered on earlier midterms and is only appearing on the final exam, you can expect any problems from that section to be relatively straightforward. I also said in lecture that you may be asked to determine the values of x which make a certain series (like $\sum x^n/n!$) converge; although this looks like a Section 8.3 problem, it's totally solvable using methods in Section 8.2 like the Ratio Test.

The hope is that you can earn full credit on any of the problems from Section 8.2. But be careful–historically it's common for 3283 students in December to think, *it's the end of the semester, and I'm busy with projects in other classes, and I've already learned about series and power series before, so I can skip a few classes*, and then also not study for those topics before the final exam. **Please don't fall into this trap!** Even if you've done a lot with series before, it's easy to get tripped up while trying to find the value of $\sum 1/(n^2+2n+2)$, or determine if $\sum n!/n^n$ converges, if you haven't practiced these types of problems.

The best advice I can give about studying for the final is the same that I've given for previous midterms: you should learn the definitions and theorems, but **there is no substitute for *doing* problems**. It's easy to listen to an instructor solve a problem, but that's much different than being able to do it on your own, under time pressure, and without any notes, textbooks, or other resources. If you work through enough problems out of the textbook, previous exams and homework, you'll walk into the exam with the confidence that (a) you've seen and solved most of the "standard" types of questions you'll see on the final, like a proof of convergence, and (b) you have the skills to work out anything that is different than those standard questions. As an added bonus, by working on problems you'll probably learn the theorems and definitions you need by heart, without a lot of extra effort.

Which problems should you solve? Here's some specific advice:

- Look over all three midterms; solutions will be posted by reading day (Thursday 12/12). Focus on any problems you struggled with. Read the online solutions and ask us questions as needed until they make sense. Then see if you can solve the problem correctly without looking at any notes, books, etc. Then look in the textbook to find any similar problems and solve those.
- Repeat the above process with any homework assignments and writing quizzes. Recall that most of the skills problems were graded for completion, so the lack of a written comment on your returned assignment does not guarantee it was correct; check with the online solutions.

- Once you've looked over previous problems and want to study a particular section, the true/false questions at the beginning of each Exercise set are a good way to check whether you remember the definitions and basic results from the section.
- As mentioned on previous guides, another technique for studying definitions and theorems is to come up with your own examples to learn why certain distinctions and conditions are important. In the Monotone Convergence Theorem, why is it important that the sequence is bounded? In the topology section, why would a set which does not include one of its boundary points not satisfy the definition of closed set?
- Don't set out to memorize the proof of every theorem in the book. There are certain standard proofs involving open/closed sets, intersections/unions/complements of sets, etc., but in general if a proof is on the exam, you should be able to figure it out using definitions and other given information. [In other words, if I ask you to prove the composition of two surjective functions is surjective (assuming the domains/ranges match up, etc.), then you can figure that out from the definition of surjective function and not by having memorized the proof of Theorem 2.3.20(a) and reproducing it word for work on the exam.]
- It's easier and more fun to study the problems that we're good at, but in the long run you'll get more benefit from doing the kinds of problems you didn't like, even if it's a struggle. If you get stuck, ask us for help!

Here are a few suggested problems from the sections that historically give people the most trouble in this class. (This list isn't meant to be comprehensive, and you shouldn't ignore the other sections. There's also some overlap here with previous assignments.)

§2.2: 14, 22, 32

§2.3: 9, 10, 11, 16, 17

§2.4: 3(a,b,c), 4, 11

§3.1: 7, 15, 19

§3.2: 6, 7

§3.3: 3/4(b, c, d, l, m)

§3.4: Theorem 3.4.10, Corollary 3.4.11, 3/4(b,c,e), 11