The third exam picks up where the second left off, covering Sections 17, 18, 32 and 33. That doesn't sound like much compared to the 6-8 sections covered on each of the previous midterms, but these sections are very dense and have a lot of material. Don't get caught thinking "I learned about sequences and series in my Calculus course, so I don't need to study as much for this test."

To study for this test you should learn the definitions and theorems, but there is no substitute for *doing problems*. You can understand the comparison test, but if you haven't done a lot of comparison problems, you may not realize what to compare $\sum \frac{1}{3+2^n}$ to. Similarly, you might be able to look at a sequence and determine its limit using methods from Calculus, but if you haven't worked out limits using the precise methods of Section 17, you will be hard pressed to do so on the test.

You can look at your lecture notes and homework assignments to get a good feel for what topics I feel are important and are likely to appear on the test. Redo any homework problems that you struggled with. I've also included a list of review problems below. The TAs and I can help you with these during office hours and recitation sections. To provide an extra benefit for those who work on these review problems, a portion of the test will be based on problems which appear here. At first you should use your textbook, notes and other resources if you're stuck, but your eventual goal is to be able to solve these problems without using any help.

Another technique for studying definitions and theorems is to come up with your own examples to learn why certain distinctions and conditions are important. Can you quickly give an example of a series which converges conditionally but not absolutely? In the comparison test, try removing one of the conditions, like $a_n, b_n \geq 0$; can you find a counter-example to show that the comparison test is no longer true without that condition?

Suggested Problems

In each section, the true/false questions at the beginning of the section are good way to refresh your memory about the section. In addition I'd suggest the following as review problems to start with:

§17: 17.3, 17.5(c,e,g,i,k), 17.6, 17.15(a), 17.16

§18: 18.3(a), 18.4, 18.5, 18.6, 18.7

§32: 32.3, 32.4(a,c), 32.5(c,e,i)

§33: 33.5(b,c,d,g,j), 33.6

You will be asked to justify or prove certain facts or theorems on the exam as well. If a theorem took me 40 minutes to prove in class, I will certainly not ask you to prove it on an exam. But we have covered some important theorems whose proofs are fairly short, especially if you are only asked to prove a portion of a result. For example, proving part (a) [or part (b)] of the comparison test is fairly quick if you rely on the Monotone Convergence Theorem (MCT). Other examples of theorems with fairly short proofs include 17.12, 18.8, 32.5, and 33.5, although this isn't intended to be a comprehensive list.