A quick review for Exam 3, SH

Exam 3 will mainly include problems similar to those on HW5 and HW6 [Chs. 8.5 thru 10.6]. This overlaps Exam 2 slightly [Chs. 8.5, 8.6]. The exam may also include recent lecture topics [Chs. 10.7, 10.8] but with only fairly simple questions on those. There are several good ways to prepare, but mainly work exercises and learn the main theorems.

Exercises: See the Exam 2 review page for general study advice. Some specific remarks -

Prepare for HW-type problems on partial fractions and improper integrals.

Be able to calculate the Trapezoid Rule and Simpson's Rule. I will not provide those formulas, but I will provide numbers that you need, since you will not have a calculator. Prepare to use the error bounds; you don't have to totally memorize them, but know what M and n mean, etc. We didn't cover the Midpoint Rule as much, but know what it is.

Study and understand the vocabulary at the start of Ch.10 (monotone, bounded, etc) and that convergence of a series is about convergence of its partial sums. Know the special types of series (geometric, telescoping, p-series) and how to check for convergence, and find sums (for the geometric and telescoping series). Prepare for exercises about repeating decimals, recursively defined sequences, monotone sequences, etc.

Practice all the convergence tests, including the skill of choosing a good test for each example. Prepare to find the interval of convergence of a power series. Be ready to work with a power series in sigma notation or otherwise. The exam will not cover the last sections of Ch 10 on Taylor Series.

Conceptual questions: As usual, there may be TF, and/or a proof. Probably 1-2 proof options would come from the list below. Some of the old exams on the Exam Page include remarks on good proof-writing style and common mistakes in proofs. Prepare for at least 2 of these:

* State and Prove the Divergence Test. The key step is $a_n = s_n - s_{n-1}$, which you might want to memorize.

* State and Prove the Comparison Test. With two series, there are two sequences of partial sums. A key formula in the proof is $s_n \leq t_n \leq M$.

* State and Prove the geometric series theorem about $S = \frac{a}{1-r}$ including a proof of the s_n formula.