Review Sheet for Final

Format: the format of the final will be similar to that of the first and second midterms. At least half the problems will concern material beyond that tested on the two midterms. This review sheet is directed at this portion of the exam. At least one third of the final will be devoted to older material. The review sheets for the midterms (as well as the midterms themselves!) should be useful for refreshing your knowledge of that material. All told, I'd like to make the final equal in length to about 1.5 midterms.

Things to know:

Definitions and statements. Upper bound, supremum (least upper bound), lower bound, infimum, sequence, completeness axiom, Archimedean Property, convergent sequence, bounded sequence, monotone sequence, Cauchy sequence, subsequence, Bolzano-Weierstrass Theorem, k-ary expansion, Squeeze Theorem.

Proofs you should know: (from new material) Bolzano-Weierstrass Theorem, real numbers are uncountable.

Computational skills. General facility with inequalities; determining the supremum of a set (in particular, whether it exists); checking whether a sequence is monotone; computing the k-ary expansion of a given rational number, and conversely, determining a rational number from a given k-ary expansion.

Good topics for proofs. Proofs concerning supremums/infimums. Proofs using the definition of a limit (i.e. of convergence of a sequence). Proofs using the monotone convergence theorem.

Some problems about k-ary expansions to try. 13.6, 13.14, 13.15, 13.16, 13.18, 13.33, 13.37, 14.6, 14.7, 14.35, 14.36, 14.39.

Advice for studying: The advice I gave concerning the first two exams still applies. I don't think I have much new to add this time.