Some thoughts on the final exam

This handout gives some suggested areas of focus for the final exam. It is not a review; it should focus, but not limit, your study. Any topic discussed in class, on the homework or in readings could be covered on the final.

There will be no more than seven numbered problems on the exam.

(1) The main topics we studied are limits, derivatives, integrals, sequences and series. It would make sense to go over old homework problems, class work and notes relating to each of these main concepts.

(2) We spent some time in each part of the semester studying sequences and series, with some attention to conditions for convergence. During the second part, we rigorously defined convergence of a sequence, as well as Cauchy sequences and some related results. You should be able to rigorously prove convergence or divergence of a sequence, and you should understand and be able to apply the tests for series convergence we studied. You should understand the definition of a Cauchy sequence and be able to prove or disprove that a sequence of real numbers is Cauchy.

(3) You should understand rigorous definitions from class along with their “high school calculus” versions, and you should also be able to accurately explain some ideas for algebra or pre-calculus students. A good exam question may ask you to move among various “levels” of definitions.

(4) In particular, you should understand definitions of a limit, a derivative and an integral.

(5) You should be comfortable with the type of work we did in class: Take an unfamiliar theorem and try to understand it; explain it in your own words; think about why it seems to be true; try to illustrate the theorem with an example; delete a hypothesis and try to find an example where the conclusion fails; think about a proof.

(6) Point-set topology. (Open sets, closed sets, accumulation points, etc.)

(7) There may be a question asking you to relate something we have done in class to the high school curriculum.

(8) Problem number 2 from the last exam, perhaps with part c deleted, will be on the final.

(9) You will be asked to prove and/or explain one of Theorems 2.37, 2.38, and 2.40.