

## Review Sheet for the Final Exam

**Standard disclaimer:** The following represents a sincere effort to help you prepare for our exam. It is not guaranteed to be perfect. There might well be minor errors or (especially) omissions. These will not, however, absolve you of the responsibility to be fully prepared for the exam. If you suspect a problem with this review sheet, please bring it to my attention (bounty points are possible).

**Time and place:** the exam will take place Monday December 14 from 4:15-6:15 in 127 Hayes-Healy. It will be comprehensive, including questions from all parts of the semester, but emphasizing newer material, particularly stuff (open/closed/compact sets, finding extrema of scalar-valued functions and least squares solutions of linear systems) not covered on the midterms.

Specifically, the relevant chapters of the book are 1-5, except for sections 1.5, 4.5 and subsections 5.5.2-5.5.3. There are bits and pieces elsewhere that I either skipped (e.g. sequences) or did differently (e.g. closed sets). Canonical versions of all definitions/statements are the ones in my own notes.

**Ground Rules and Format:** Similar to exams 1 and 2.

- We defined a lot of stuff and stated a lot of theorems in class, but some statements (e.g. definition of differentiable, definition of a linear transformation, chain rule) are more important than others (e.g. definition of an elementary matrix, definition of partial derivative, squeeze theorem), and I'm more likely to ask you to actually state the things I regard as important. OTOH, I'm not going to give you a precise list of what those things are.
- Like exam 1, there'll be a true/false/counterexample section. I'll likely ask for a couple of short proofs, but unlike exam 2, I'm not asking you to memorize any of the really involved proofs (e.g.  $C^1$  implies differentiable) from lecture.
- You definitely want to know how to compute a least squares solution and use the method of Lagrange multipliers. So take advantage of hwk 11 for practice.

**Unsolicited advice.** Same as before.