

Math 185 Homework 2.Due Wednesday 2/5

Do *4 out of 6* of the following groups of exercises. You are encouraged to try more, but if you do please indicate which ones you do and do not want graded.

This homework set is taken from Stein and Shakarchi, Chapter I.4 (exercises for all of chapter I). Exercise I.n denotes exercise n of chapter I.4

- 1. I.1, I.3** — for building intuition on complex numbers and algebra
- 2. I.6** (also consider doing I.5, but don't turn it in) — for building intuition on the notion of connected and compact sets
- 3. I.8, I.10.** Also look at I.11 (don't turn it in). *This is a slightly more advanced set of problems* for learning to work with the differential operators $\bar{\partial}(F) = \frac{\partial F}{\partial x} + i\frac{\partial F}{\partial y}$ and Δ (the Laplacian) — we will not focus on this formalism much, but it is useful for people interested in relating complex analysis to other topics in analysis.
- 4. I.9** Treat this as a standard multivariable calculus problem without worrying about limits, convergence, etc. Note that the Cauchy-Riemann equations in the book split our complex-valued function $F(x, y) := f(x + iy)$ into two functions $u(x, y) + iv(x, y)$.
- 5. I.16 a-d, I.17** For working with power series.
- 6. I.18** Working with power series and changing order of summation.