Math 185—Introduction to Complex Analysis
Haiman, Summer 2014

Problem Set 1
Due Wednesday, June 25

General guidelines: on homework problems asking you to show or prove something, give a coherent logical argument, written out in complete sentences.

On computational problems, explain your method, or write out the computation in enough detail so that your method is clear. Many computational exercises in the textbook have answers provided so you can check your work.

You may discuss ideas on the homework with other students, but you must write up your solutions independently, without copying from notes taken in group work. Homework assignments which appear to be too similar will receive a score of zero and a warning from me.

Copying homework solutions from outside sources such as the internet, students who have taken the course previously, or solution manuals, is absolutely prohibited. This form of cheating may result in a failing grade for the class and other disciplinary action.

The problems on this set, covering only the first two lectures, are mostly computational, to get used to working with complex arithmetic. On future problem sets you can expect a larger proportion of conceptual and theoretical problems, asking for proofs and/or requiring creativity to solve.

I'll designate exercises from the book by, for instance, 2.6 to mean Section 2, Exercise 6. These numbers refer to the *9th Edition* of Brown & Churchill.

Exercises from the textbook: 2.2, 2.6(b), 2.11, 5.5(a), 6.2(b), 9.1(b), 9.5(d), 11.6, 11.8.

Additional problem:

Given $w = 1 + 2i$, $z = -1 + \sqrt{3}\, i$, find:

(a) $2w - \sqrt{3}z$

(b) wz

(c) $1/z$

(d) w/z

(e) $|w|$, $|z|$, $|wz|$ and $|w + z|$. How are $|wz|$ and $|w + z|$ related to $|w|$ and $|z|$?

(f) $\mathrm{Arg}(w)$, $\mathrm{Arg}(z)$, and $\mathrm{Arg}(wz)$. How is $\mathrm{Arg}(wz)$ related to $\mathrm{Arg}(w) + \mathrm{Arg}(z)$? Take care to use principal values here.

(g) z^5

(h) $w\overline{w}$

(i) $wz + \overline{w}\,\overline{z}$