

# CS 2802: Homework 6

October 4, 2020

Handed out Oct. 5, due Oct. 12. This is a short problem set that will help you prepare for the prelim.

- Do the following problems:
  - 9.51
  - 9.61
  - 9.63(a),(b) [Hint: for part (a), you can use the results of Exercise 9.11, whether or not you actually got the right proof.] I think that 9.63(c) is harder than the text intended. I'm giving it as a challenge problem. Think about (but don't hand in) 9.63(d).
  - 9.76
  - 9.81
  - Challenge problem 1 (no need to hand it in): Do Exercise 9.63(c). [As I said above, I think that this problem is harder than the text intended. Their hint isn't good enough to solve the problem. Here's a better hint: (1) Figure out how many perfect squares there are mod  $p$ , and (2) you can assume that the polynomial  $x^{(p-1)/2} \equiv 1 \pmod{p}$  has at most  $(p-1)/2$  solutions. (In general, a polynomial of degree  $k$  has at most  $k$  solutions; this is true both mod  $p$  and without mods.)]

Some of you might find 9.86 interesting, although again, you don't have to hand it in.

For recitation: 9.61(a), 9.76(a), 9.80 (or, instead of 9.80, come with another problem not on this week's homework that you want to look to prepare for the prelim).