**Directions.** Try each problem alone at first for 15-20 minutes; afterwards, you can collaborate, but list collaborators on the top left of your paper; your name on the top right.

It is illegal to consult problem set solutions from earlier semesters, or solutions on the internet.

Cite by name or number significant theorems or examples from the text to justify your work or reasoning; you can’t cite results in Exercises or Problems in the textbook, however, unless the problem allows it.

**Reading:**

**9.1–3** Functions. This is for background and should be familiar; skim it to see what’s in it, and get an idea how well you know it. We won’t do much with inverse functions (9.4) beyond what you learned in calculus. Section 9.5 is just for culture, so you can nod sagely at the dinner table when senior 18’s are holding forth.

**10.1–10.3** Transporting to functions the language used for sequences. Read and try the first three problems below before continuing with 11.1. Refer back to 9 if needed.

**11.1** Continuous functions: introduction, definition, examples; discontinuity types.

**Problem 1.** (2)

a) Work 10.1/6b (needs 18.01 calculus)

b) Work 10.1/7b (Use absolute values to express boundedness efficiently, as in 10.1, (2).)

*In these next two problems, the difficulty is mainly in getting the work in logical order, and then writing it up clearly. Do the work on scratch paper first.*

**Problem 2.** (2) Work 10.3/2

Do not use an indirect argument – argue directly. Focus on the conclusion: i.e., start with an arbitrary $x_0$. What is it you wish to prove about $f(x_0)$?

(Use absolute values for boundedness, as in Problem 1b above.)

**Problem 3.** (2) Work 10.3/4 (numbered 5 in some very old printings)

For practice with the “for $x \approx a$” terminology.

**Problem 4.** (2) Work 11.1/4. (Older printings: the exponential law is $e^{a+b} = e^a e^b$).

**Problem 5.** (2) Work 11.1/6. Use the hint given.