**Math 25b — Problem Set 6, due Friday, March 20.**

1. CS, p. 352 #1, #7a, #14 (also look at #15)
2. CS, p. 357 #1, #3, #6, #12 (note the typo in #3 — it should read "$f(x)g(x)|_a^b$")
3. CS, p. 371 #10, #11, #12abcg, p. 379 #5 and p. 383 #6
4. (a) Suppose $f\colon S \to \mathbb{R}$ is a nonnegative bounded function, and there is a set $X \subset S$ of content zero with $f(x) = 0$ if $x \notin X$. Show that $f$ is integrable, and

$$\int_S f = 0.$$

(You can appeal directly to the definition of the integral, or else show that the closure $\overline{X}$ also has content zero, and that $f$ is continuous at all points $x \notin \overline{X}$)

(b) Show that you can conclude the same thing if you don't assume $f$ nonnegative.

(c) Now suppose $f$ and $g$ are two bounded functions on $S$ which are equal except on $X$. Show that $f$ is integrable if and only if $g$ is, and

$$\int_S f = \int_S g.$$