

### 18.100B Problem Set 7

Due in class Monday, April 13. You may discuss the problems with other students, but you should write solutions entirely on your own.

1. Let  $f$  be the real-valued function on  $[0, 1]$  defined by

$$f(x) = \begin{cases} 1/q & \text{if } x \text{ is rational and } x = p/q \text{ in lowest terms} \\ 0 & \text{if } x \text{ is irrational.} \end{cases}$$

Prove that  $f$  is Riemann-integrable, and that

$$\int_0^1 f(x)dx = 0.$$

2. Text, page 138, number 8.
3. Text, page 139, number 10, parts (a)–(c).
4. Text, page 141, number 16.