Part I: Read and Respond (prepare for class Monday, April 28)

Glance through Section 5.4 to get the big picture—do not worry about the details, though they are interesting!—and read Section 5.5.

Reading Questions 1 and 2: Before you read anything in Chapter 7: what do you remember about integrals? What do you remember about the Fundamental Theorem of Calculus?

Read Section 7.1 (note: the first reading question needs to be answered before you get to page 217). Carefully read the first two pages of Section 7.2, stopping at the bottom of page 219, taking notes for yourself. Answer the following questions to turn in as part of your Part I assignment. Review the syllabus for parts (a)–(c) that should be included in this assignment.

More Reading Question(s)

3. Before you get to page 217: Do you think that the function $h(x)$ right below Figure 7.1 should be integrable on $[0, 2]$? If so, what do you think the integral should be? If not, why not?
4. Give an example of a partition of $[0, 1]$ that contains at least 5 points.
5. Right above Definition 7.2.2, Abbott says "For a particular partition P, it is clear that $U(f, P) \geq L(f, P)$." Why is that clear (is it clear)?
6. How do we know that $L(f)$ and $U(f)$ exist?
7. In the proof of Theorem 7.2.8, why is
$$U(f) - L(f) \leq U(f, P_\epsilon) - L(f, P_\epsilon)?$$
8. Further down in that proof (in the last string of equations/inequalities), why is
$$U(f, P_\epsilon) - L(f, P_\epsilon) \leq U(f, P_1) - L(f, P_2)?$$

Part II: Exercises (prepare for class for Monday, April 28)

1. Exercise 7.2.2
2. Consider $\displaystyle\int_0^2 f(x)\,dx$ for the function $f(x) = \begin{cases} 2 & \text{if } x \leq 1 \\ 1 & \text{if } x > 1. \end{cases}$
   (a) Recall from Calculus I that the definite integral gives the signed area under the curve. Using geometry, what should $\displaystyle\int_0^2 f(x)\,dx$ equal?
   (b) Find $U(f, P)$ and $L(f, P)$ for $P = \{0, \frac{1}{2}, 1, \frac{3}{2}, 2\}$.
   (c) Note that $f(x)$ is not continuous on $[0, 2]$, so Theorem 7.2.9 is not helpful for determining integrability. We may, however, be able to use Theorem 7.2.8 to determine the integrability of $f(x)$ on the interval $[0, 2]$. Review that theorem and see if you can find a partition that will work to show that $f(x)$ is integrable on $[0, 2]$.

Part III: Problems

Nothing new; feel free to turn in up to 5 revisions in the last week of classes if you'd like!