Math 8
Winter 2020

Preliminary Homework
Due Friday, January 17

Note: Preliminary homework is always graded credit or no credit. **You get full credit for completing the assignment, whether or not your answers are correct, as long as your work shows you have thought about the problem.** The purpose of preliminary homework is to start you thinking about the topic of the next class.

You may use your preliminary homework for in-class activities with your classmates. You should be sure to think about these questions so you will be prepared.

Preliminary homework is always due at the *beginning* of the next class.

Recall that you first defined the definite integral as the limit of Riemann sums. In the simplest form: Break the interval $[a, b]$ into n-many subintervals of length $\Delta x = \dfrac{b-a}{n}$. For each i between 1 and n, choose a point x_i^* in the i^{th} subinterval. Then

$$\int_a^b f(x)\,dx = \lim_{n\to\infty}\left(\sum_{i=1}^{n} f(x_i^*)\Delta x\right) = \lim_{\Delta x\to 0}\left(\sum_{i=1}^{n} f(x_i^*)\Delta x\right).$$

(In a less simple form, the subintervals do not have to be the same length, as long as the length of the longest subinterval approaches zero.)

The left endpoint or right endpoint Riemann sum is obtained by choosing x_i to be the left or right endpoint of the i^{th} subinterval.

1. Write out the left endpoint Riemann sum with $n = 4$ for the integral

$$\int_1^2 \frac{1}{x}\,dx.$$

   You can leave your answer as a sum of fractions.

2. Choose the correct answer. $\lim_{n\to\infty}\left(\sum_{i=1}^{n}(f(x_i))^2\Delta x\right) =$

   (a) $\left(\int_a^b f(x)\,dx\right)^2$.

   (b) $\int_a^b (f(x))^2\,dx$.

   (c) Neither (a) nor (b).