

LB 118, Sections 009 & 010, Fall 2015
Homework 9 (due 11/18)

Instructions: Please write your solutions to the problems below on a clean piece of paper (not this piece of paper). Show the steps taken to arrive at each answer.

You may work with other students on homework problems. For this assignment, each student must submit his or her own solution to the first problem. The first problem is an actual exam problem from a previous semester.

For the second problem, you may partner with up to three other students and submit one solution for your group; each student in the group will receive the same score for the last problem.

1. (a) Evaluate the sum: $\sum_{i=1}^4 (2 - i)$.
 - (b) Re-index the sum so that it starts with $k = 0$: $\sum_{k=1}^{17} k^2$.
 - (c) Compute the left-endpoint Riemann sum of $f(x) = \sqrt{x}$ using the partition $\Delta = \{1, 4, 9\}$ of the interval $[1, 9]$. Is this an underestimate or an overestimate of the value of the integral $\int_1^9 \sqrt{x} dx$? Justify your answer by sketching the region whose area is represented by this integral and the rectangles corresponding to the Riemann sum.
2. Use a spreadsheet to compute the right endpoint Riemann sum of $f(x) = \frac{4}{1+x^2}$ on the interval $[0, 1]$ using 100 rectangles of equal width. Your solution should include the following:
 - a description of the cells and the formulas that you used to compute the Riemann sum above.
 - the numerical answer
 - the exact value of the integral according to Wolfram Alpha

Here are some hints:

- The A1 cell should be labeled i . Enter 0 into the A2 cell. Then type the following into the A3 cell: =A2+1. Then copy the A3 cell and paste it into the cells A4–A101 in column A.

- Create useful labels for additional columns, e.g. Δx .
- Utilize spreadsheet features like in the example above to automate the calculations. Please ask questions on Piazza if you need help.