Math 1231 Spring 2024
Single-Variable Calculus I Section 11
Mastery Quiz 1
Due Tuesday, January 23

This week's mastery quiz has one topic. Please do your best on that topic. Don't worry if you make a minor error, but try to demonstrate your mastery of the underlying material.

Feel free to consult your notes, but please don't discuss the actual quiz questions with other students in the course.

Remember that you are trying to demonstrate that you understand the concepts involved. For all these problems, justify your answers and explain how you reached them. Do not just write "yes" or "no" or give a single number.

Please turn this quiz in class on Thursday. You may print this document out and write on it, or you may submit your work on separate paper; in either case make sure your name and recitation section are clearly on it. If you absolutely cannot turn it in in person, you can submit it electronically but this should be a last resort.

Topics on This Quiz

- Secondary Topic 1: Estimation

Name:

Recitation Section:

Secondary Topic 1: Estimation

(a) Suppose $f(x) = x^2 + 3x$, and we want an output of approximately 10. What input a should we aim for if we want $a > 0$? Find a δ so that if our input is $a \pm \delta$ then our output will be 10 ± 1. Justify your answer.

(b) We want to amplify an electrical signal. Our amplifier will multiply the voltage by a factor of six, and we want an output signal of $24 \pm \varepsilon$ volts. Find a formula for δ in terms of ε, so that if the input error is less than δ then the error in the output is less than ε. Make sure your formula gives the **largest** δ **possible**, and justify your answer.