MA 113 Calculus I, Fall 2018
Written Assignment #1
Due Friday, August 31, 2018, at beginning of lecture

Instructions: The purpose of this assignment is to develop your ability to formulate and communicate mathematical arguments. Your complete assignment should have your name and section number on each page, be stapled, and be neat and legible. *Unreadable work will receive no credit.*

You should provide well-written, complete answers to each of the questions. We will look for correct mathematical arguments, complete explanations, and correct use of English. Your solution should be formulated in complete sentences. As appropriate, you may want to include diagrams or equations written out on a separate line. You may read your textbook to find examples of how we communicate mathematics.

Students are encouraged to use word-processing software to produce high quality solutions. However, you may find that it is simpler to add graphs and equations using pen or pencil.

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1. (4 points)

    (a) Write down the algebraic expression/formula for the piecewise defined function $f(x)$ with the following properties. Explain how you found your answer.

    - The domain of $f(x)$ is $[-1, 3]$.
    - The graph of $f(x)$ for x in $[-1, 1]$ is a straight line from the point $(-1, -2)$ to the point $(1, 1)$.
    - The graph of $f(x)$ for x in $[1, 3]$ is a quadratic function passing through the points $(1, 1)$, $(2, 4)$, and $(3, 9)$.

    (b) Sketch a graph of $f(x)$.

2. (4 points) John states (incorrectly) that the domain of $g(x) = 2^{x \cdot \ln(\sin(x))}$ is all real numbers, since any real number can be plugged into x and $\sin(x)$. Why is he incorrect? What is the correct domain of $g(x)$? Explain your answer.