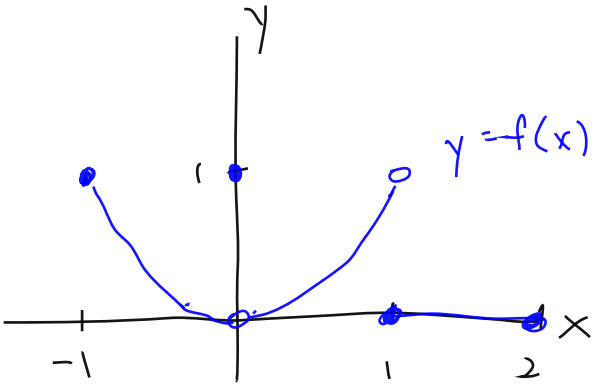
Assessment 2 - Math 141, Frank Thorne (thorne@math.sc.edu)

Monday, September 21, 2020

Instructions.

- Please work without books, notes, calculators, cell phones, or any assistance from others.
- Use of computers during the assessment is not allowed, except to look at the questions and ask me questions. You can ask me questions by email or by Blackboard **private** chat.
- Once you're done, please photograph your work, convert it to a single file in PDF format and rename it `141-[yourlastname]-a1.pdf` and send it by email to thorne@math.sc.edu.
- This assessment is subject to the Carolina Honor Code.
- When finished, please don't leave! We'll have a half-length lecture afterwards.

1. A function $y = f(x)$ is graphed. Determine which of the following statements are true and which are false:



   (a) $\lim_{x \to -1^+} f(x) = 1$; (b) $\lim_{x \to 0^-} f(x) = 1$;

   (c) $\lim_{x \to 0} f(x)$ exists; (d) $\lim_{x \to 1} f(x) = 0$.

2. Give the definition of the *derivative* of a function $f(x)$ at the point $x = a$. (Please give the algebraic definition, using an equation.)

   Draw a picture and explain why your equation gives the slope of the tangent line to the graph of $f(x)$ at $x = a$.

3. Using the definition of the derivative, differentiate the function $f(x) = x + \frac{9}{x}$ and find the slope of the tangent line at $x = -3$.

   Note: This question asks you to use the definition of the derivative directly. No credit for answers which use the power or quotient rules, or which don't show any work.

When done, write out and sign: I pledge under the Honor Code that I have neither given nor received any unauthorized aid.