Quiz 5A, Calculus I - Calculators okay

Dr. Graham-Squire, Spring 2014

Name: _____

1. (5 points) You are given a function $f(x)$ such that $f'(x) = \dfrac{4x-6}{3(x-2)^{2/3}}$ and $f''(x) = \dfrac{4x-12}{9(x-2)^{5/3}}$.

   (a) Find all intervals of increase and decrease, and x-values of all maximums and minimums, if there are any.

   (b) Find all intervals of concavity, and the x-values of all inflection points, if there are any.

   (c) $f(0) = 0$. Use this point and the information from parts (a) and (b) to sketch a graph of the function $f(x)$.

   Note: you do <u>not</u> need to take any derivatives for this question!
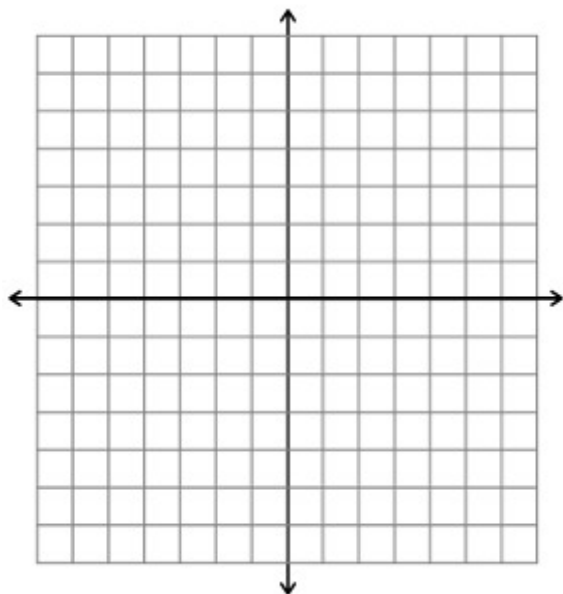
2. (2 points) Use calculus to evaluate the limit. If the limit does not exist, write ∞, $-\infty$, or DNE, whatever is most appropriate.

$$\lim_{x \to (-\infty)} \frac{e^{-x}}{x^2}$$

3. (3 points) You are given 1000 cm^2 of material to make a cylinder. Find the <u>radius</u> (to the nearest 0.01 cm) you would want in order to make a cylinder with the *largest* possible volume. The formulas for volume and surface area for a cylinder are $V = \pi r^2 h$ and $SA = 2\pi r^2 + 2\pi rh$.