

Name: _____ / 10

Circle one: Faudree (F01) | Bueler (F02) | VanSpronsen (UX1)

This OPTIONAL Quiz is worth 10 points. The purpose is to get some additional practice and additional feedback prior to Midterm 2. **No aids (internet, other students, book, calculator, etc.) are permitted.** You do not need to simplify final answers, but **answers without supporting work will lose points for completeness and effort.**

1. [4 points] Answer the questions below for the function $f(x) = e^{2x} - 4e^x + 1$.
- Evaluate $\lim_{x \rightarrow -\infty} f(x)$ and explain what this implies about the graph of $f(x)$.
 - Determine the intervals of increase or decrease and identify the x -values of any local extrema. State whether they are maxima or minima.)
 - Determine the concavity of the graph of f and find the x -values of any points of inflection.
 - Use the information about to sketch the graph of f . Your graph should give the coordinates of at least two points.

2. [2 points] Find the limit. Use l'Hospital's Rule where appropriate.

a. $\lim_{x \rightarrow 1} \frac{x^p - 1}{2x - 2}$, where p is a fixed constant.

b. $\lim_{x \rightarrow \infty} x \ln \left(1 + \frac{5}{x} \right)$

3. [4 points] A rectangular box with square base must have volume 20 cubic meters. Material for the base and sides costs \$ 2 per square meter. Material for the top costs \$6 per cubic meter. Find the dimensions of the least expensive box.