Name: _____ _____ **/ 25**

Please circle your instructor's name: Leah Berman Jill Faudree James Gossell

There are 25 points possible on this quiz. Any outside materials (textbook, course notes, calculator) are not allowed. **For full credit, show all work in a way someone else can follow it.**

1. (9 points) Find the radius, r, and height, h, of the open-topped cylinder with volume 8π that has the least amount of surface area. The formulas for the volume, V, and surface area, S, are given below.

   $V = \pi r^2 h, \quad S = \pi r^2 + 2\pi rh$

2. (8 points) Use L'Hôpital's Rule to evaluate the limits below. Indicate your use of L'Hôpital's Rule with $\stackrel{h}{=}$ or $\stackrel{L'H}{=}$ or something similar.

   (a) $\lim_{x\to 0} \dfrac{e^{2x}-2x-1}{5x^2}$

   (b) $\lim_{x\to\infty} \sqrt{x}e^{-x}$

3. (8 points) Evaluate the integrals below.

   (a) $\displaystyle\int (3x^5+\sin(x)+e^x+\pi^2)\,dx$

   (b) $\displaystyle\int \frac{3x+x^{1/3}}{x}\,dx$