LB 118, Sections 009 & 010, Fall 2015
Homeworks 10 & 11 (due 12/7)

Instructions: Please write your solutions to the problems below on a clean piece of paper (not this piece of paper). Show the steps taken to arrive at each answer.

You may work with other students on homework problems. For this assignment, each student must submit his or her own solutions to all of the problems. All of the problems are previous exam questions.

1. Compute $\displaystyle\int_0^{\ln 2} e^{-2x}\,dx$.

2. Compute $\displaystyle\int_{-1}^1 \frac{1}{10+3x}\,dx$.

3. Water is being pumped into a tank at a rate of $10\,\text{ft}^3/\text{min}$. An engineer determines that the volume of water in the tank can be described as a function of the height of the water line according to the following formula:
$$V(h) = \int_0^h \frac{\pi x^2}{4}\,dx.$$
   How fast is the height increasing when the water level is 12 ft?

4. What is the maximum area of a rectangle inscribed under the ellipse $9x^2 + 4y^2 = 36$ as shown below? (Suggestion: Use implicit differentiation to simplify the computation.)