Math 205 Exam II

7:15–8:15pm, Thursday March 3, 2005

Instructor:________________ **Class Time:**____________ **Name:**____________________

No books or notes are allowed. Please read the problems carefully and do **all** you are asked to do. **You must show your work!** You can use the back page as scratch paper. Do the problems in the space provided.

Total/100	#1	#2	#3	#4	#5	#6	#7	#8

1(total points: 14). In each of the following two accounts, find the balance 10 years after their opening, assuming that no withdrawal be made.

(a)(7 points). $10,000$ initial deposit, 8% annual interest rate, compounded continuously.

(b)(7 points). $10,000$ initial deposit, 8% annual interest rate, compounded quarterly.

2(total points: 11). The operation record of a company shows that when it produces 250 units of certain goods weekly, the weekly total cost is \$12,000, and the marginal cost is \$60 per unit. Estimate the weekly total cost if the company increase the production level to 300 units.

3(total points: 12). Assume $f(x) = x^x$. Use the average rate of change over the interval $1.99 \leq x \leq 2.01$ to estimate $f'(2)$.

4(total points: 12). Differentiate

(a)(6 points). $f(x) = 2 + 2\sqrt{x} + \frac{2}{x}$

(b)(6 points). $f(t) = e^t + 3 \cdot 5^t - \ln t$

5(total points: 15).

(a)(5 points). Find the derivative of $f(x) = (1 + 2x)^{2005}$.

(b)(5 points). Find the derivative of $f(x) = \ln(1 + x^2)$.

(c)(5 points). Find the derivative of $f(x) = 3e^{-2x}$.

6(total points: 12). Differentiate

(a)(6 points). $P(t) = t \ln t$

(b)(6 points). $y = \dfrac{e^x}{1+x}$

7(total points: 12). Cost and revenue functions for a charter bus company are shown in the following figure. Should the company add a 50th bus? How about a 90th? Explain your answers using marginal revenue and marginal cast.

8(total points: 12). Find an equation for the tangent line at $x = 1$ to the graph of $y = \ln(2x - 1) + 3$.