MATH 205 EXAM 2

7:30—8:30 pm, Thursday March 15, 2007

Instructor's Name:_____ **Name:**_____

No books or formula sheets are allowed. Use the back page as a sketch paper. For full credit, show your work in detail.

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

1 (12 pts, 6 each.) Find the derivative for each problem.

- **a.** $y = 8x^3 - 4x^2 + 12x - 3$.

- **b.** $y = 3t^5 - 5\sqrt{t} + \dfrac{7}{t}$

2 (12pts). Find the derivatives for each function using chain rules.

- **a. 7pts**. $w = (s^2 + 1)^{100}$.

- **b. 6pts.** $z = 5 + \ln(3t + 2)$.

3 (12pts, 6 each). Find the derivative for each function using the product rule or quotient rule.

- **a.** $f(x) = xe^{-2x}$.
  $f'(x) =$

- **b.** $z = \dfrac{1-x}{1+x}$
  $z'(x) =$

4 (13 pts). Find the equation of the tangent line to $y = e^{-2x}$ at $x = 0$.

5 (10 pts). The values of the derivative $f'(x)$ of a function are given in following table:

x	0	1	2	3	4	5	6	7	8	9	10
$f'(x)$	5	2	1	-2	-5	-3	-1	2	3	1	-1

a Estimate all critical points

b . Indicate each of them as a local minima or a local maxima.

6. (13pts, 5 each) A function is given by $f(x) = x^3 + 3x^2 - 9x + 12$.

- **a.** Find all its critical points
- **b.** Find its inflection point(s)
- **c.** Apply second derivative test to identify each critical point as local minima or local maxima. (You must make use of second derivatives).

7 (12 pts). For the function $f(x) = 4\ln x - x$, and $3 \leq x \leq 5$, find the global minimal and global maximal values of $f(x)$, and indicate where they are reached.

8 (13 pts.) The Cost function of producing q items is given by: $C(q) = 7000 + 4q^2$.

(1. 3pts). Find the fixed cost.

(2. 3pts). If ecah item is sold for \$600, find the revenue function $R(q)$.

(3. 7pts). At which level of q is the profit $P(q)$ maximized ?

(4). What is the maximal profit?