Name(Print) ______________________ Lecture Time______________________

Signature ______________________ Instructor______________________

General Calculus - MATH 205, Fall 2007
Exam II, Fall 2007

page	1	2	3	4	5	6	7	8			Total
points											

1. Show the details of your work under each question. 2. Clearly label your answer and your exposition may have effect on grading. 3. Each problem is worth 10 points, except for #2 (20 points) and #3 (20 points).

1. The cost and revenue functions for a company is shown below.

(a) should the company produce the 50th item? How about 90th item? Explain.

(b) At approximately what production level is the marginal cost smallest? Explain.

(c) should the company increase or decrease production from $q = 100$? Explain.

2. Find the derivatives of the following functions. Show intermediate steps in order to receive partial credit.

   (a) $f(x) = x^{4/3} + \sqrt{x},\ f'(x) =$

   (b) $f(x) = \frac{1}{x^4} + \frac{1}{2x},\ f'(x) =$

   (c) $f(x) = x(\sqrt[3]{x} + 2),\ f'(x) =$

   (d) $f(x) = \frac{1}{\sqrt[4]{x}},\ f'(x) =$

3. Find the derivatives of the following functions. Show intermediate steps in order to receive partial credit.

(a) $f(x) = (2x)^{4/3} + \sqrt{3x}$, $f'(x) =$

(b) $f(x) = \frac{\ln x}{x^4} + \frac{2^x}{2x}$, $f'(x) =$

(c) $f(x) = e^x(\ln x + 2)$, $f'(x) =$

(d) $f(x) = (x^2 + 3)^{40}$, $f'(x) =$

4. Find the equation of the tangent line to $f(x) = x\ln(x)$ at $x = 3$.

5. (a) State the definition of critical points.

(b) Find all the critical points for $f(x) = x^3(1-x)^4$.

6. Suppose f has a continuous **derivative** whose values are given in the 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 the x-coordinates of critical points of f for $0 \leq x \leq 10$.

(b) For each of the critical point, indicate if it is a local maximum of f, or local minimum, or neither.

7. (a) State the definition of an inflection point.

(b) When Paul got up in the morning he put on only a light jacket because, although the temperature was dropping, it seemed that the temperature would not go much lower. But Paul was wrong. Around noon a northerly wind blew up and the temperature began to drop faster and faster. The worst was around 6pm when, fortunately, the temperature started going back up. Sketch a graph of the temperature as a function of time and estimate the time for the inflection point in the graph.

8. The strength of a drug in the bloodstream is given function $f(t) = te^{-t}$. The time range is from $t = 0$ to $t = 10$ hours. Find the times when the drug has maximum strength and minimum strength.