Math 205 Exam 2

Thursday March 12

Your name:______________________________

Instructor's name:__________________________ **Time the class meets:**__________________

Calculators are permitted. You can also use a 4×6 inches note card with formulas prepared in advance. No books are allowed. Use the back pages as sketch paper. For full credit, show your work in detail. If you use a calculator at some step, you should state that you are doing so.

Total: 100	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8
100	10	10	10	10	10	30	10	10

1. (10 points) For a function $f(x)$ we know that $f(30) = 68$ and $f'(30) = -2$. Estimate $f(31)$, $f(33)$, $f(28)$.

2. (10 points) a. Does the derivative of the function given by the following table appear to be positive or negative over the given interval? Explain.

t	0	1	2	3	4	5
$s(t)$	-39	-37	-34	-30	-20	4

b. Does the second derivative of the function appear to be positive or negative over the given interval? Explain.

3. (10 points) The following figure shows part of the graph of cost and revenue functions. Which is greater, marginal cost or marginal revenue, at

(a) q_1?

(b) q_2?

Explain your answer.

4. (10 points) Find the equation of the tangent line to $f(x) = (x-1)^4$ at the point $x = 0$.

5. (10 points) On the graph of f' below indicate the x-values that are critical points of the function f itself. Are they local maxima, local minima, or neither? Explain your answer.

6. (30 points) Find the derivative of the following functions:

a) (2 points) $3e^x - x$

b) (2 points) $q^2 - 2\ln q$

c) (3 points) $\frac{1}{r^{7/2}}$

d) (3 points) $-\sqrt{\frac{1}{x^3}}$

e) (3 points) $12.41(0.94)^t$

f) (3 points) e^{-x}

g) (3 points) $\sqrt{1-x^2}$

h) (3 points) $x3^x$

i) (3 points) $\frac{3z}{1+2z}$

j) (5 points) $\frac{\sqrt[3]{x}e^{2x}}{\ln(x^2+1)-3}$

7. (10 points) For the function $f(x) = x^3 + 6x^2$

a) find f' and f''

b) find all the critical points of f

c) identify all its local and global maxima and minima on the interval $-5 \leq x \leq 1$

8. (10 points) Graph a function with only one critical point (at $x = 10$) and one inflection point (at $x = 5$). Label the critical point and the inflection point on your graph.