Math 205 Exam 2

Thursday October 16

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	30	10	10	10	10	10	10

1. (10 points) Graph the derivative of the given function.

2. (30 points) Find the derivative of the following functions:

a) (2 points) $5x$

b) (2 points) $q^3 + 10$

c) (2 points) $e^t - \ln t$

d) (3 points) $2 \cdot 10^x - x^3$

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

f) (3 points) $6e^{2x} + e^{-x^3}$

g) (3 points) $\ln(x^{10} - 1)$

h) (3 points) $x \cdot 2^x$

i) (4 points) $\sqrt{e^x + 1}$

j) (5 points) $\ln(u \cdot e^u)/(1 + u\sqrt{u})$

3. (10 points) For some painkillers, the size of the dose, D, given depends on the weight of the patient, W. Thus, $D = f(W)$, where D is in milligrams and W is in pounds.

(a) Interpret the statements $f(140) = 120$ and $f'(140) = 3$.

(b) Use the above information to estimate $f(145)$, and $f(150)$. Which estimation is more reliable?

4. (10 points) For the given function

(a) Estimate the intervals on which the derivative is positive and the intervals on which the derivative is negative.

(b) Estimate the intervals on which the second derivative is positive and the intervals on which the second derivative is negative.

5. (10 points) The following figure shows part of the graph of cost and revenue for a car manufacturer. Which is greater, marginal cost or marginal revenue, at

(a) q_1?

(b) q_2?

Explain your answer.

6. (10 points) Find the equation of the tangent line to the graph of $y = 2^x$ at $x = -1$. Check your work by sketching a graph of the function and the tangent line on the same axes.

7. (10 points) Graphs of $f(x)$ and $g(x)$ are given below. Evaluate $\frac{d}{dx}g(f(x))|_{x=70}$.

8. (10 points) (a) Graph a function with two local minima and two local maxima.

(b) Graph a function with two critical points that are neither a local maximum, nor a local minimum.