Math 205 Exam 1

Thursday February 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	# 9	# 10
100	10	10	10	10	10	10	10	10	10	10

1. (a) Is the function f below increasing or decreasing? Is the graph concave up or concave down?

(b) Estimate the average rate of change of f between $t = 10$ and $t = 20$.

(c) Give the units for the answer in (b) assuming that x is measures in meters and y in years.

2. A company has cost function $C(q) = 250,000 + 3q$ dollars and revenue function $R(q) = 13q$ dollars.

(a) What are the fixed costs for the company?

(b) What is the variable cost per unit?

(c) What price is the company charging for its product?

(d) Find the cost and revenue at $q = 5,000$. Does the company make profit? What about 50,000?

(e) Find the profit function and the break-even point. Graph the profit function.

3. (a) Is the function given by the table below linear, exponential, or neither? Explain your answer.

x	0	1	2	3
$f(x)$	4.30	6.02	8.43	11.80

(b) Give a possible formula for this function.

4. Solve for t using natural logarithms

$$5^t = 1,000,000.$$

5. If the quantity of a substance decreases by 4% each hour, find its half-life.

6. A bank account is earning interest at 6% per year compounded continuously. By what percentage has the bank balance in the account increased over one year? (This is the effective annual yield.)

7. For the function $y = f(x)$ below

graph

(a) $-f(x)$

(b) $f(x) - 1$

(c) $f(x + 2)$

8. For each of the functions below determine whether or not it is a power function. If it is a power function, write it in the form $y = kx^p$ and give the values of k and p.

(a) $2\sqrt{x}$

(b) 3^x

(c) $\frac{3}{(2x^3)^2}$

9. Match the points labeled on the curve with the given slopes

Slope	Point
-3	
-1	
0	
0.5	
2	

10. In the graph of the function $f(x)$ below, at which of the labeled x-values is

(a) $f(x)$ greatest?

(b) $f(x)$ least?

(c) $f'(x)$ greatest?

(d) $f'(x)$ least?