Math 121   Name: _____

QUIZ #2 (SAMPLE QUESTIONS)

Show all work, simplify as appropriate, and use "good form and procedure" (as in class).
Box in your final answers; write units where appropriate!
**No notes or books allowed.**

PART 1 (NO CALCULATORS!)

1) Let $f(x) = \dfrac{4x}{x^2 + 1}$. Find $f'(x)$. Simplify your answer. (6 points)

2) Let $f(x) = x^6(3x+1)^4$. Find $f'(x)$. Simplify your answer. Do <u>not</u> expand out powers; for example, don't work out $(3x+1)^4$. (6 points)

3) Let $y = \sqrt[3]{x}$. Find $\left.\dfrac{d^2 y}{dx^2}\right|_{x=8}$. (9 points)

4) Let $C(x)$ be a cost function, where x is the number of units produced. Find an expression for the marginal average cost function, and simplify as appropriate. Your answer will include $C(x)$ and $C'(x)$. (6 points)

5) Consider the graph of the function f below. (6 points total; 2 points each)
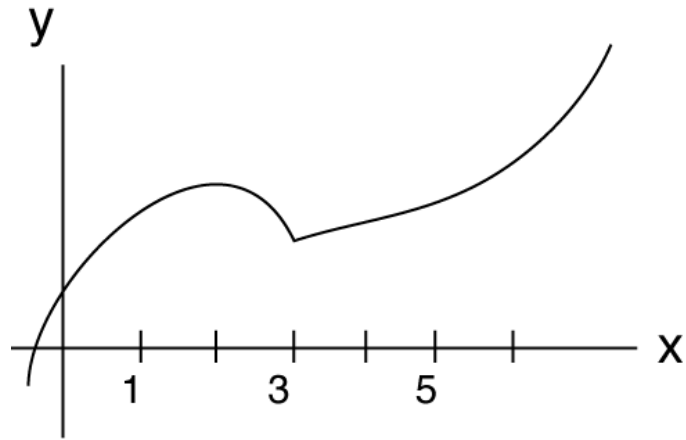
For each of the following, indicate whether it is positive, negative, zero, or DNE (Does Not Exist).

a) $f'(3)$ _____

b) $f'(5)$ _____

c) $f''(1)$ _____

PART 2 (USE A SCIENTIFIC CALCULATOR!)

6) The population P of Springfield t years after January 1, 1990 $(0 \le t \le 13)$ is given by $3t^2 + 500$. You do <u>not</u> have to use the limit definition of derivative. Write units.

    a) What is the instantaneous rate of change of Springfield's population on January 1, 2000?

    b) How fast is the rate of increase of Springfield's population changing on January 1, 2000?