Math 121   Name: _____

QUIZ #4 (SECTIONS 4.3, 4.4, 5.1, 5.2)

MATH 121 – FALL 2003 – KUNIYUKI
105 POINTS TOTAL, BUT 100 POINTS = 100%

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. A scientific calculator is allowed.

USE A SCIENTIFIC CALCULATOR!

1) Find the derivatives. Simplify where possible. (21 points total)

a) $D_x\left[\ln\left(2x^4 + 3\right)\right]$ (4 points)

b) $D_x\left(x^2 \ln x^2\right)$ (8 points)

c) $D_w\left(e^{w/9}\right)$ (4 points)

d) $D_x\left(5e^{x^2-3x}\right)$ (5 points)

2) Let $f(x) = \dfrac{\ln x}{x^3}$. Simplify where possible: (13 points total)

a) Find $f'(x)$.

b) Find $f'(1)$.

3) Find the integrals. Simplify where possible. (35 points total)

a) $\int (5x^2 + 3x - 2)dx$ (7 points)

b) $\int x^2(x-4)dx$ (7 points)

c) $\int \dfrac{dx}{x^8}$ (5 points)

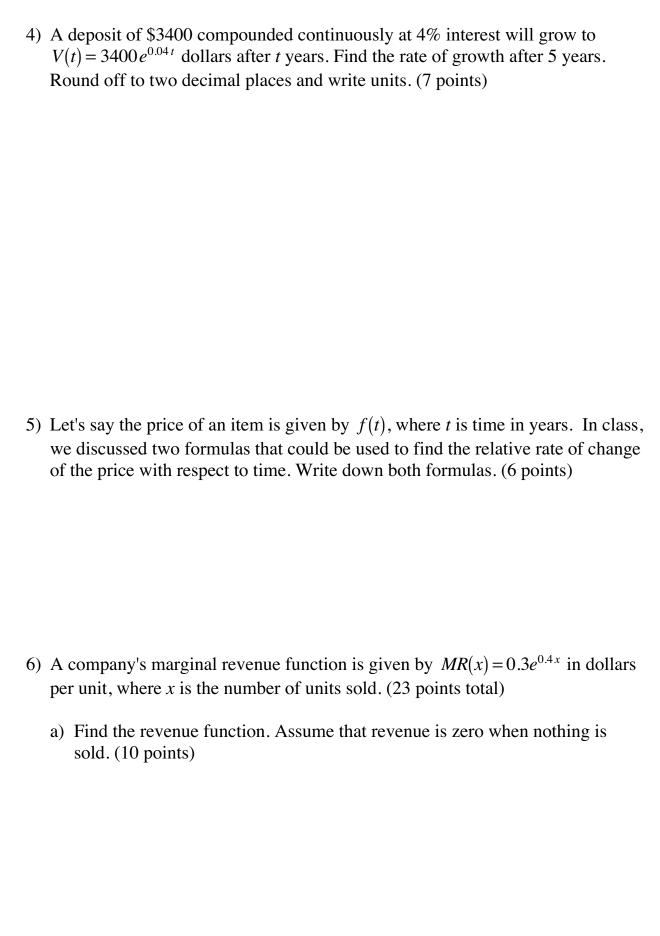d) $\int \left(\dfrac{2}{x} + \dfrac{7}{\sqrt[4]{x^3}} \right) dx$ (8 points)

e) $\int e^{0.4t}\, dt$ (4 points)

f) $\int \dfrac{7}{3x}\, dx$ (4 points)

4) A deposit of $3400 compounded continuously at 4% interest will grow to $V(t) = 3400e^{0.04t}$ dollars after t years. Find the rate of growth after 5 years. Round off to two decimal places and write units. (7 points)

5) Let's say the price of an item is given by $f(t)$, where t is time in years. In class, we discussed two formulas that could be used to find the relative rate of change of the price with respect to time. Write down both formulas. (6 points)

6) A company's marginal revenue function is given by $MR(x) = 0.3e^{0.4x}$ in dollars per unit, where x is the number of units sold. (23 points total)

   a) Find the revenue function. Assume that revenue is zero when nothing is sold. (10 points)

YOU MAY CONTINUE ON THE NEXT PAGE.

b) Use part a) to find the revenue when 7 units have been sold. Round off to the nearest cent. (3 points)

c) How many units have to be sold in order to achieve a revenue of $100? Round off to the nearest integer unit. Show all steps, as we have done in class. (10 points)