

QUIZ #2 (SECTIONS 2.4, 2.5, 2.6, 2.7)

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.

PART 1 (USE A SCIENTIFIC CALCULATOR!): 31 points

1) The position function of a particle in inches is given by $s(t) = 5t^3 + 4t$, where t is time in seconds. Write units! (13 points total)

a) What is the position of the particle at time $t = 2$?

b) What is the velocity of the particle at time $t = 2$?

c) What is the acceleration of the particle at time $t = 2$?

TURN OVER THIS SHEET! MORE ON THE BACK!

2) A computer company's cost function is $C(x) = 400x + 5000$ in dollars, where x is the number of computers produced. (18 points total)

a) Find the average cost function, $AC(x)$.

b) Find $\lim_{x \rightarrow \infty} AC(x)$.

c) Find the marginal average cost function, $MAC(x)$.

d) Evaluate $MAC(40)$ and interpret your answer.

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PART 2 (NO CALCULATORS!): 74 points

3) Let $f(x) = \frac{x^2 - 3}{x^3 + 2}$. Find $f'(x)$. Simplify your answer. (10 points)

4) Find $\frac{d^2}{dx^2}(4x^3 - 3x^2 + 2)$. (6 points)

5) For each of the following, find $f'(x)$. Simplify your answer. All exponents must be positive in your final answer. Do not expand out powers; for example, don't work out $(9x + 4)^6$. (36 points total)

a) $f(x) = \sqrt[3]{x^2 + 5x}$ (8 points)

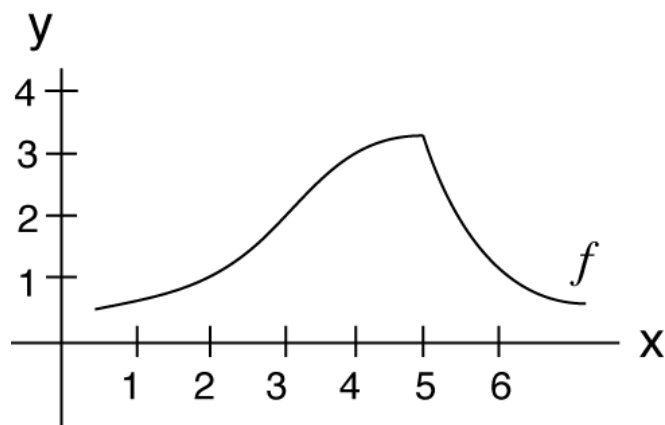
b) $f(x) = \frac{1}{(9x + 4)^6}$ (8 points)

c) $f(x) = x^3(4x - 2)^6$ (8 points)

d) $f(x) = (7x^2 + 3)^4(3x - 10)^5$ (12 points)

6) Find functions f and g such that the function represented by $\sqrt[3]{x^2 + 5x}$ is the composition $f(g(x))$. (4 points)

7) Consider the graph of the function f below. (18 points total; 3 points each)



For each of the following, circle one. DNE means "Does Not Exist."

- | | | | | |
|--------------------|----------|------|----------|-----|
| a) $f'(2)$ is ... | positive | zero | negative | DNE |
| b) $f''(2)$ is ... | positive | zero | negative | DNE |
| c) $f'(4)$ is ... | positive | zero | negative | DNE |
| d) $f''(4)$ is ... | positive | zero | negative | DNE |
| e) $f'(5)$ is ... | positive | zero | negative | DNE |
| f) $f'(6)$ is ... | positive | zero | negative | DNE |