MA 223 Exam 1 Summer 2006

Name: _____

Student ID: _____

INSTRUCTIONS:

1) There are 10 problems and 1 multiple choice problem on a total of 8 pages.
2) Write your final answers in the boxes provided.
3) You must show sufficient work to justify all answers. Correct answers with inconsistent work may not be given credit.
4) No books or notes are allowed.
5) You may use a nongraphing, nonprogrammable calculator.
6) Good luck!!

Page	**Max. Possible**	**Points**
1	6	
2	14	
3	12	
4	12	
5	10	
6	12	
7	20	
8	14	
Total	100	

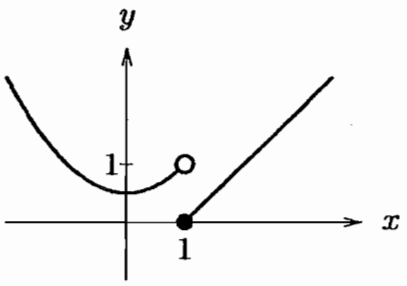
(6 pts) I. Multiple choice question.
Note: You must answer correct to receive a credit.

Given the graph of $y = g(x)$, which is true?

I. $\lim_{x \to 1} g(x) = 0$

II. $\lim_{x \to 1^-} g(x) = 1$

III. $\lim_{x \to 1^+} g(x) = 0$



A. Only I

B. Only II

C. Only I and III

D. Only II and III

E. All are true

II. This part of the exam consists of ten problems.
Show ALL your work to be eligible for partial credit.

(7 pts) 1) Find domain of the function. Write your answer in interval notation.

$$f(x) = \frac{\sqrt{-x-1}}{3x^2+5x-2}$$

(7 pts) 2) If $f(x) = x^2 + 3x + 1$, $g(x) = \sqrt{x^2+5}$
find $(f \circ g)(-2)$.

3. Find the following limits:

(6 pts) (a) $\lim_{x \to 2} \dfrac{x^2 - 5x + 6}{2x - 4}$.

(6 pts) (b) $\lim_{x \to \infty} \dfrac{x^3 - 2x^2 + 1}{4x^3 + 5x + 4}$.

(12 pts) 4. Find $f'(x)$ using the definition of the derivative (4-step process) $f(x) = -x^2 + 4x$.

(10 pts) 5. Find the slope and equation of the tangent line to the curve $f(x) = -\frac{x^4}{2} - 2x + 4$ at the point $\left(-1, \frac{9}{2}\right)$.

(6 pts) 6. Find $f'(x)$ using rules of differentiation

$$f(x) = \frac{2x^3 - \frac{4}{\sqrt{x}} + 5}{x}.$$

(6 pts) 7. Find $f'(4)$ if $f(t) = -2\sqrt{t} + \dfrac{4}{\sqrt{t}} + 1$.

(14 pts) 10. The cumulative ticket sales for the 12 days preceding a popular concert is given by

$$S(x) = 4x^2 + 50x + 5000$$

where x, $1 \leq x \leq 12$, represents the number of days before the concert.

(7 pts) (a) What is the average rate of change in sales from day 1 to day 5?

(7 pts) (b) What is the rate of change in sales on day 5?

Answers.

I. D

II.

1. $(-\infty, -2) \cup (-2, -1]$
2. 19
3. (a) $-\frac{1}{2}$ (b) $\frac{1}{4}$
4. $-2x + 4$
5. $y = \frac{11}{2}$
6. $4x + \frac{6}{x^2\sqrt{x}} - \frac{5}{x^2}$
7. $-\frac{3}{4}$
8. $V = 4t + 50$
9. $P = 100 + 10x$
10. (a) 74 tickets/day (b) 90 tickets