

Name: \_\_\_\_\_

Instructor: \_\_\_\_\_

**Math 10550, Exam 1**  
**February 17, 2006**

- The Honor Code is in effect for this examination. All work is to be your own.
- No calculators.
- The exam lasts for 50 min.
- Be sure that your name is on every page in case pages become detached.
- Be sure that you have all 9 pages of the test.

PLEASE MARK YOUR ANSWERS WITH AN X, not a circle!					
1.	(a)	(b)	(c)	(d)	(e)
2.	(a)	(b)	(c)	(d)	(e)
.....					
3.	(a)	(b)	(c)	(d)	(e)
4.	(a)	(b)	(c)	(d)	(e)
.....					
5.	(a)	(b)	(c)	(d)	(e)
6.	(a)	(b)	(c)	(d)	(e)
.....					
7.	(a)	(b)	(c)	(d)	(e)

**Please do NOT write in this box.**

Multiple Choice \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

11. \_\_\_\_\_

Total \_\_\_\_\_

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Multiple Choice

1.(8 pts.) Find  $\lim_{x \rightarrow -1} \frac{x^2 - 2x - 3}{x + 1}$ .

(a) -1

(b) 0

(c) 4

(d) 1

(e) -4

2.(8 pts.) Find  $\lim_{t \rightarrow 1} \frac{t - 1}{\sqrt{t + 3} - 2}$ .

(a) 0

(b) 4

(c) 8

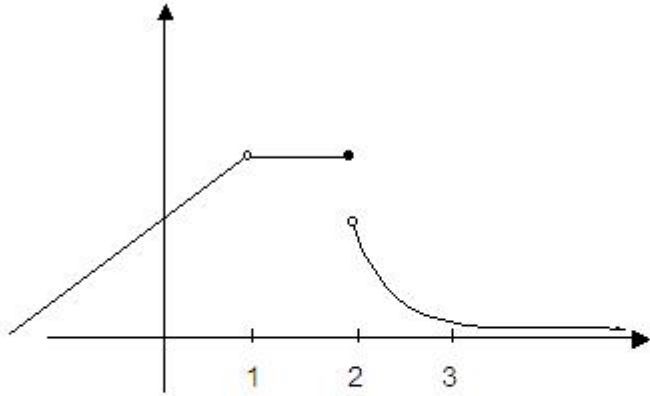
(d) 1

(e) The limit does not exist.

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3.(8 pts.) The graph of the function  $f(x)$  is given below. For what value(s) of  $a$  does the limit  $\lim_{x \rightarrow a} f(x)$  **NOT** exist.



- (a) 1 and 2 only                      (b) 2 and 3 only                      (c) The limit exists everywhere.  
(d) 1 only                                  (e) 2 only

4.(8 pts.) Compute  $\lim_{x \rightarrow 2^-} \frac{x^2 - x - 2}{(x - 2)^2}$ .

- (a)  $\infty$                                       (b) 1                                      (c)  $-\infty$   
(d) 0    (e) The limit does not exist and is not  $\infty$  or  $-\infty$ .

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5.(8 pts.) Compute  $\lim_{x \rightarrow 1} \frac{\sqrt[3]{x^2} - 1}{x - 1}$ .

(a) 0

(b)  $\frac{3}{2}$

(c) 1

(d)  $\frac{2}{3}$

(e) The limit does not exist.

6.(8 pts.) Find the equation of the tangent line to  $y = 3x^2 - 2x + 1$  at  $(2, 9)$ .

(a)  $y = 6x - 2$

(b)  $y = (6x - 2)(x - 2) + 9$

(c)  $y = 10x - 11$

(d)  $y = 10x + 9$

(e)  $y = 2x + 9$

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7.(8 pts.) For what value of the constant  $c$  is the function  $f$  continuous at  $x = 1$ , where

$$f(x) = \begin{cases} 2x^2 + 2c, & x \leq 1 \\ cx + 1, & x > 1 \end{cases} ?$$

- (a) no value of  $c$                       (b) 1 only                      (c) -1 only  
(d) any value of  $c$                       (e) 0 only

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Partial Credit

You must show your work on the partial credit problems to receive credit!

8.(11 pts.)

(a) Let

$$f(x) = (x^2 + \sec x) \tan x.$$

Compute  $f'(x)$ .

(b) Let

$$g(x) = \frac{x - \cos x}{2 \sin x - 3}.$$

Compute  $g'(x)$ .

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9.(11 pts.) A ball is thrown vertically upward with an initial velocity of 32 ft/s. Then the height in feet after  $t$  seconds is given by

$$h(t) = 32t - 16t^2.$$

What is the maximum height the ball reaches?

(Hint: What is the velocity when the ball stops moving upwards?)

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**10.**(11 pts.) Let  $f(x) = \frac{1}{x+1}$ .

(a) Compute  $f'(x)$  using the definition of the derivative.

(b) Compute  $f'(x)$  using differentiation rules.

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**11.**(11 pts.) Show that the equation

$$x^3 + 3x^2 - 1 = 0$$

has at least one solution. Identify the theorem you are using.

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10.	_____
11.	_____
Total	_____