MAT131 Calculus I Fall, 2000

Midterm Exam, Oct. 12, 2000, 8:30-10:00 P.M.

Name: _____ **ID:** _____
Section: _____ **Section Teacher:** _____.

If you are not sure of your section, consult the table below.

Section	Instructor	Time
1	Mieczkowski	Tu Th 2:20
2	Mieczkowski	Tu Th 3:50
3	Kim	M W 5:30
4	Krol	M W 2:15
5	Lundberg	M W 8:20
6	Coffee	M W 10:30
7	Kim	M W 8:30
9	Buse	Tu Th 8:20
10	Yau	M W 3:20
11	Friedman	Tu Th 9:50
12	Friedman	Tu Th 12:50
13	Sporn	Tu Th 8:20
14	Yau	M W 2:15
15	Behrstock	Tu Th 11:20
16	Behrstock	Tu Th 3:50
17	Rasdeaconu	Tu Th 7:00
18	Buse	Tu Th 8:20

Problem	Points	Grade
1	12	
2	15	
3	9	
4	10	
5	10	
Total	56	

WORK all problems on these pages. SHOW all work you want graded. WRITE CAREFULLY: points may be taken off for meaningless statements.

1. Let $f(x) = \frac{1}{2x}$.

a) Find the slope of the secant line which passes through the points $(1, f(1))$ and $(3, f(3))$.

b) Find the equation of this secant line.

c)Find the slope of the tangent line to the graph of f which passes through the point $(1, f(1))$.

d) Find the equation of this tangent line.

2. Find each limit or explain why it does not exist:

a)

$$\lim_{x \to 1} \frac{x^3 - 1}{x - 1}$$

b)

$$\lim_{x \to 0} \sin(1/x)$$

c)

$$\lim_{x \to 0} x \sin(1/x)$$

d)

$$\lim_{x \to 0^-} \frac{|x|}{x}$$

e)

$$\lim_{x \to -\infty} \frac{3x^4 - 2x^2 + 1}{2x^3 - 3x + 2}$$

3. Let $\lfloor x \rfloor$ denote the largest integer that is less than or equal to x.
   a) Find

$$\lim_{x \to 2^+} \lfloor x \rfloor.$$

b) Find

$$\lim_{x \to 2^-} \lfloor x \rfloor.$$

c) For what values of x is $\lfloor x \rfloor$ continuous?

4. a) State the Intermediate Value theorem.

b) Use it to show that the equation

$$\frac{1}{3}x^3 - x^2 - x + 1 = 0$$

must have at least one solution in the interval $[0, 2]$ and at least one solution in the interval $[3, 6]$.

c) Does the equation in part b) have any negative solutions? Explain your answer carefully.

5. a) Find all values of x for which the function

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

is defined.

b) Find

$$\lim_{x \to -1} \{f(x)\}$$

c) Find the horizontal and verticle asymptotes of the curve $y = f(x)$.