FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS AND STATISTICS
MATH 249(L04)
MIDTERM

Fall,2003   **D. Oliveros**

October,2003   Time: 50 minutes

Student ID:_____

I agree that this paper may be placed in front of the classroom for pick-up.**Yes**

or **No**_____

PLEASE write your Name on the very last page.

1. Which of the following is the domain of the function $f(x)$. Justify your
   answer   [10]

$$f(x) = \sqrt{\frac{8 - 2x}{x^2 - 7x}}$$

   (a) $(0, 7) \cup (7, \infty)$

   (b) $(-\infty, 0) \cup [4, 7)$

   (c) $(-\infty, 0) \cup (7, \infty)$

   (d) $\{x \in \mathbb{R} \mid x \neq 0, 7\}$

   (e) None of the above.

2. Which of the following is the value of the limit. Justify your answer. [10]

$$\lim_{x \to 0} \frac{6x \sin(6x)}{\cos(6x) - 1}$$

(a) ∞

(b) 2

(c) -2

(d) Does not exist.

(e) None of the above.

3. Which of the following possibilities is the value of the following limit. Justify your answer. [10]

$$\lim_{x \to -\infty} \frac{5x^3 + 2x^2 + 2}{7x^2 + 4}$$

(a) 0

(b) ∞

(c) $\dfrac{5}{7}$

(d) $-\infty$

(e) None of the above.

4. Find the value of the constant c (if any) that make the function continuous everywhere. Justify your answer. [20]

$$f(x) = \begin{cases} x^2 - c^2 & \text{if} \quad x < 4 \\ cx + 20 & \text{if} \quad x \geq 4 \end{cases}$$

(a) $c = 0$

(b) $c = -\dfrac{4}{5}$

(c) $c = -4$

(d) $c = -2$

(e) None of the above.

5. Which of the following is $\dfrac{dy}{dx}$ when y and x satisfy the following equation. Show your work.

[10]

$$y + \cos y = x$$

(a) $\dfrac{dy}{dx} = \dfrac{1}{\sin y}$

(b) $\dfrac{dy}{dx} = -\sin y$

(c) $\dfrac{dy}{dx} = \dfrac{1}{1 - \sin(y)}$

(d) None of the above.

6. Find the equation of the tangent line to the curve $x^2 + y^2 = 1$ at the point $\left(\dfrac{1}{\sqrt{2}}, \dfrac{1}{\sqrt{2}}\right)$.

[10]