MA 125 00, CALCULUS I
August 26, 2010

Name (Print last name first): .....

Student Signature: .....

TEST I

No calculators are allowed!

PART I

Part I consists of questions. Clearly write your answer (only) in the space provided after each question. Show all of your your work!

All problems in Part I are 6 points each

Evaluate the following limits.

Question 1

$$\lim_{x\to 2} \frac{x^2+3x-10}{x-2}$$

Answer: .....

Question 2

$$\lim_{x\to 0} \frac{\sin(7x)}{2x}$$

Answer: .....

Question 3

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

Answer: .....

Question 4

$$\lim_{x\to 2} \sqrt[5]{[\sin(x)]^2 + 7}$$

Answer: .....

Question 5

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

Answer: .....

Question 6

$$\lim_{x\to\infty} \frac{\sin(x)}{x}$$

Answer: .....

Question 7

$\lim_{x \to 0} \frac{-2}{x^2} =$

Answer: .....

Question 8

$\lim_{h \to 0} \frac{(3+h)^2 - 3^2}{h}$

Answer: .....

PART II

Part II consists of 3 problems. You must show correct reasons to get full credit. Displaying only the final answer (even if correct) without the relevant steps will not get full credit.

Problem 1 (18 points)

Given the graph of the function $y = f(x)$ below find:

1. $\lim_{x \to -1^-} f(x) =$
2. $\lim_{x \to -1^+} f(x) =$
3. $\lim_{x \to -1} f(x) =$
4. $\lim_{x \to 2^-} f(x) =$
5. $\lim_{x \to 2^+} f(x) =$
6. $\lim_{x \to 2} f(x) =$
7. $\lim_{x \to \infty} f(x) =$
8. State all intervals on which $f(x)$ is continuous.

Problem 2 (18 points)

You may use that $(5.1)^3 = 132.651$ and $(5.01)^3 = 125.751501$. If the position of a particle at time t is given by $S(t) = t^3$, find:

1. the average velocity $\overline{v}_{5,\ 5.1}$ between times $t = 5$ and $t = 5.1$

2. the average velocity $\overline{v}_{5,\ 5.01}$ between times $t = 5$ and $t = 5.01$

3. Using the above, estimate the instantaneous velocity $v(5)$.

Problem 3 (16 points)

Evaluate the following limits:

1. $\lim_{h\to\infty} \sqrt{h^2+h}$

2. $\lim_{h\to 0} \dfrac{\sqrt{4+h}-\sqrt{4}}{h}$