Serial No.:_____ Student Name:_____ Student Number: _____

Instructor: M. Z. Abu-Sbeih Math 101- Q1 Date: 1-3-2008

Problem 1: (15 points) If it exists, find the limit. Use the symbols $\infty \text{ or } -\infty$ as appropriate.

a) $\lim_{x \to 1^-} \dfrac{|x^2 - x|}{x - 1}$

b) $\lim_{x \to 3^+} \ln(x - 3)$

c) $\lim_{y \to 0} \dfrac{4y + y^2}{3y - y^2}$

d) $\lim_{x \to 5^+} \left(x - [\![x]\!]\right)$

e) $\lim_{x \to 0} \dfrac{\sqrt{x^2 + 9} - 3}{x^2}$

Problem 2: (5 points) consider the graph of the function $f(x)$ whose graph is sketched below. Determine whether each of the following statements is true or false (CIRCLE ONE).

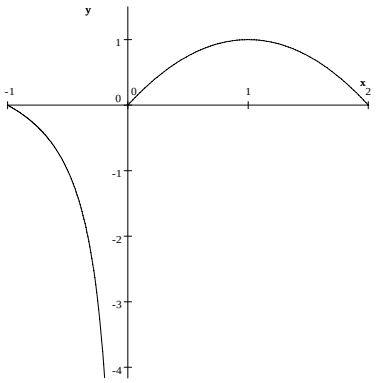
a. $\lim_{x \to 1} f(x) = 1$ T F

b. $\lim_{x \to 1} f(x) = f(1)$ T F

c. $\lim_{x \to 0} f(x)$ does not exist. T F

d. $\lim_{x \to 1} \dfrac{f(x)}{x - 1} = \infty$ T F

e. $f(x)$ has a vertical asymptote T F



Problem 3: (5 points) Use the $\in -\delta$ definition of the limit to show that $\lim_{x \to 2} (1 - 2x) = -3$.

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Problem 1: (15 points) If it exists, find the limit. Use the symbols $\infty \text{ or } -\infty$ as appropriate.

a) $\lim_{x \to 1^+} \dfrac{|x^2 - x|}{x - 1}$

b) $\lim_{x \to 2^-} \ln(2 - x)$

c) $\lim_{y \to 0} \dfrac{5y + y^2}{3y - y^2}$

d) $\lim_{x \to 4^+} \left(x - [\![x]\!]\right)$

e) $\lim_{x \to 1} \dfrac{\sqrt{x+3} - 2}{x - 1}$

Problem 2: (5 points) consider the graph of the function $f(x)$ whose graph is sketched below. Determine whether each of the following statements is true or false (CIRCLE ONE).

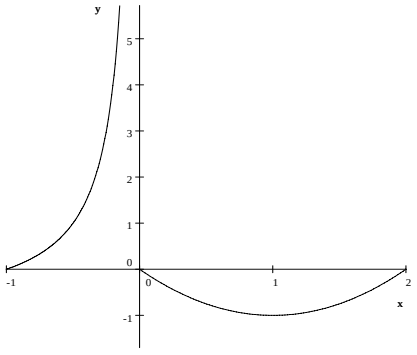
a. $\lim_{x \to 1} f(x) = -1$ T F

b. $\lim_{x \to 1} f(x) = f(1)$ T F

c. $\lim_{x \to 0} f(x)$ does not exist. T F

d. $\lim_{x \to 1} \dfrac{f(x)}{x - 1} = -\infty$ T F

e. $f(x)$ has a vertical asymptote T F



Problem 3: (5 points) Use the $\in -\delta$ definition of the limit to show that $\lim_{x \to 2} (2 - 3x) = -4$.