MATH 113 – 26 SEPTEMBER 2012 – EXAM 1

Answer each of the following questions. Show all work, as partial credit may be given.

1. (5 pts. each) For the function $f(x)$ whose graph is displayed, answer each of the following questions. If the limit exists then find its value. If the limit does not exist, then so state. If the limit is infinite, say whether is is $+\infty$ or $-\infty$. You need not justify any of your answers.

(a) $\lim_{x\to 2} f(x)$.

(b) Is $f(x)$ is continuous at $x = 0$?

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

(d) $\lim_{x\to 3} f(x)$.

(e) $\lim_{x\to -2^-} f(x)$

(f) Does $\lim_{x\to 2} f(x) = f(2)$?

(g) Determine the intervals of continuity for $f(x)$.

2. (10 pts. each) Evaluate each of the following limits.

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

(b) $\lim_{t\to 0} \dfrac{\sqrt{t+4} - 2}{t}$

(c) $\lim_{x\to 2} \dfrac{\dfrac{x+1}{x-1} - 3}{x - 2}$

3. (10 pts. each) Let $f(x) = \dfrac{x^2 - 3x}{x^2 - 4}$. Evaluate each of the following limits. If the limit is infinite you must determine whether or not it is $+\infty$ or $-\infty$.

(a) Find $\lim_{x\to\infty} f(x)$

(b) Find $\lim_{x\to -2^+} f(x)$

(c) Find $\lim_{x\to 3} f(x)$

4. (5 pts.) Assume that for the function $f(x)$ whose graph is displayed, $\lim_{x\to 3} f(x) = 0$. For the value of $\epsilon = 1.5$, find a value of $\delta > 0$ such that $|f(x)| < \epsilon$ whenever $0 < |x - 3| < \delta$.