HOMEWORK 2 - MATH 151

DUE DATE: Monday, January 26
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. One part of each homework problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. For the function f graphed below find $\lim_{x\to -2^-} f(x), \lim_{x\to -2^+} f(x)$, $\lim_{x\to -2} f(x), f(-2), \lim_{x\to -\infty} f(x), \lim_{x\to +\infty} f(x)$

2. Find the limits
   (a) $\lim_{y\to 2^-} \frac{(y-1)(y-2)}{y+1}$
   (b) $\lim x \to 4 \frac{x^2-16}{x-4}$
   (c) $\lim_{x\to -1} \frac{x^2+6x+5}{x^2-3x-4}$
   (d) $\lim_{x\to 3^+} \frac{x}{x-3}$
   (e) $\lim_{y\to 6^+} \frac{y+6}{y^2-36}$
   (f) $\lim_{x\to 4^-} \frac{3-x}{x^2-2x-8}$
   (g) $\lim_{x\to 9} \frac{x-9}{\sqrt{x}-3}$

3. Let $f(x) = \begin{cases} x-1, & \text{if } x \le 3 \\ 3x-7, & \text{if } x > 3 \end{cases}$ Find $\lim_{x\to 3^-} f(x), \lim_{x\to 3^+} f(x), \lim_{x\to 3} f(x)$.

4. Let $f(x) = \frac{x^3-1}{x-1}$. Find $\lim_{x\to 1} f(x)$.

5. Find the limits
   (a) $\lim_{x\to -\infty} (3-x)$
   (b) $\lim_{x\to +\infty} \frac{3x+1}{2x-5}$
   (c) $\lim_{x\to -\infty} \frac{x-2}{x^2+2x+1}$
   (d) $\lim_{y\to -\infty} \frac{2-y}{\sqrt{7+6y^2}}$
   (e) $\lim_{x\to +\infty} \frac{7-6x^5}{x+3}$

6. Let $f(x) = \begin{cases} 2x^2+5, & \text{if } x < 0 \\ \frac{3-5x^3}{1+4x+x^3}, & \text{if } x \ge 0 \end{cases}$ Find $\lim_{x\to -\infty} f(x)$ and $\lim_{x\to +\infty} f(x)$.

7. Find the values of x if any at which f is not continuous.

   (a) $f(x) = x^3 - 2x + 3$

   (b) $f(x) = \frac{x-4}{x^2-16}$

   (c) $f(x) = \begin{cases} 2x+3, & \text{if } x \leq 4 \\ 7 + \frac{16}{x}, & \text{if } x > 4 \end{cases}$

8. Find a value for the constant k, if possible, that will make the function continuous everywhere.

   (a) $f(x) = \begin{cases} 7x-2, & \text{if } x \leq 1 \\ kx^2, & \text{if } x > 1 \end{cases}$

   (b) $f(x) = \begin{cases} kx^2, & \text{if } x \leq 2 \\ 2x+k, & \text{if } x > 2 \end{cases}$