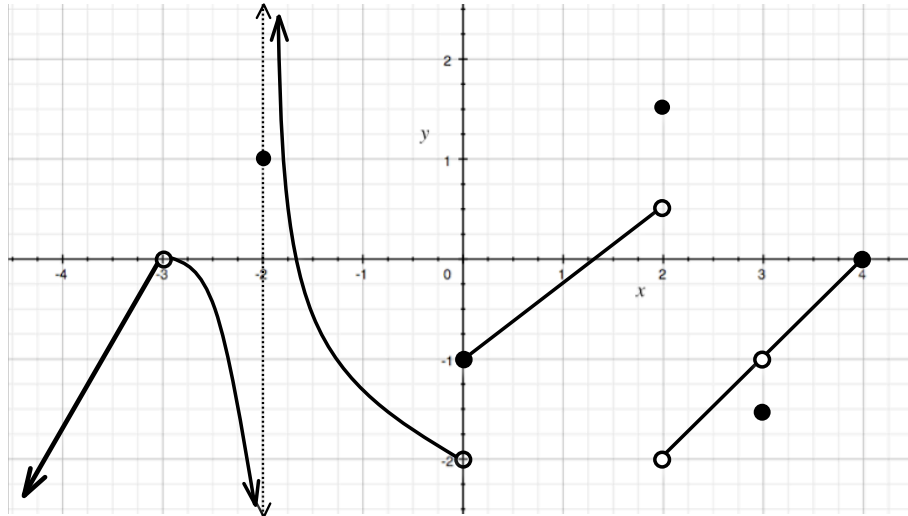**Name:** _____   _____ / 25

There are 25 points possible on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. **[12 points]** Consider the graph of the function f below.

Use the graph of f to answer each question below. If the limit is infinite, indicate that with ∞ or $-\infty$. If the value does not exist or is undefined, write DNE.

(a) $\displaystyle\lim_{x \to -3} f(x) =$

(b) $\displaystyle\lim_{x \to -2} f(x) =$

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

(d) $\displaystyle\lim_{x \to -2^+} f(x) =$

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

(f) $\displaystyle\lim_{x \to 3^-} f(x) =$

(g) $f(-3) =$

(h) $f(2) =$

(i) $f(3) =$

(j) Indicate **all** x-values for which the function f is **not continuous**.

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2. [9 points] Evaluate the following limits. Justify your answers.

a. $\lim\limits_{x \to 2} x^2 - 3x + 5$

b. $\lim\limits_{x \to 4} \dfrac{x^2 - 2x - 8}{x^2 - 5x + 4}$

c. $\lim\limits_{\theta \to \pi} \dfrac{\tan \theta}{\sin \theta}$ $\left(\text{Hint: } \tan \theta = \dfrac{\sin \theta}{\cos \theta} \right)$

3. **[4 points]** Determine whether or not the given function is continuous at $x = 5$. **Justify your answer using limits.**

$$f(x) = \begin{cases} \frac{x+3}{x-1} & \text{if } x < 5 \\ x^2 - 3x - 8 & \text{if } x \geq 5 \end{cases}$$

4. **[2 points]** BONUS: Does the equation $2x^7 - x^5 = 3x^{31} + 5x^{13} + 2x^7 + x^3$ have a solution on the interval $[-1, 1]$? Justify your answer.