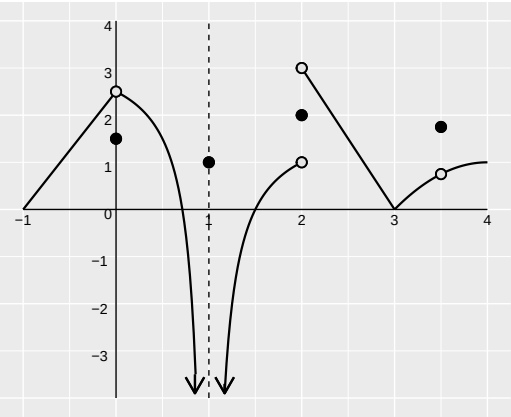
Name: _____ _____ **/ 25**

Please circle your instructor's name: Kevin Meek James Gossell Margaret Short

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 $f(x)$ below.



Use the graph of $f(x)$ 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) $\lim_{x\to 0^-} f(x) =$ (b) $\lim_{x\to 0^+} f(x) =$ (c) $\lim_{x\to 0} f(x) =$

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

(g) $f(0) =$ (h) $f(1) =$ (i) $f(2) =$

(h) Indicate **all** x-values for which the function $f(x)$ is **not continuous**:

_____

2. [9 points] Evaluate the following limits. (It is possible that a limit is infinite or doesn't exist.) Justify your answers. Be sure to use correct notation for limits in order to receive full credit.

1. $\lim_{x\to -1} x^2 - 3x + \frac{1}{x}$

2. $\lim_{h\to 2} \frac{h^2 - h - 2}{3h^2 - 9h + 6}$

3. $\lim_{\theta\to 0} \frac{\sin^2(\theta)}{\theta\cos(\theta)}$ (Hint: $\lim_{\theta\to 0} \frac{\sin(\theta)}{\theta} = 1$.)

3. [4 points] Determine whether or not the given function is continuous at $x = 1$. **Justify your answer using proper limit notation.**

$$f(x) = \begin{cases} x^2 - 2x + 3 & \text{if } x < 1 \\ \frac{5x-29}{2x-10} & \text{if } x \geq 1 \end{cases}$$

4. [2 points] BONUS: Does the equation $x + 2x^2 = 8\sqrt{x}$ have a solution for some x in the interval [1,9]? Justify your answer. (Hint: Consider the function $f(x) = x + 2x^2 - 8\sqrt{x}$.)