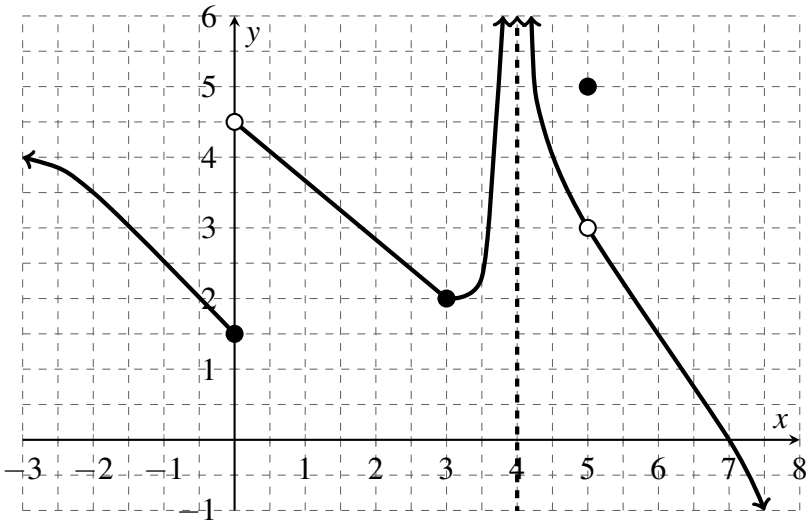
Name: _____ _____ / **25**

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

1. [11 points] Use the graph of the function $H(x)$ (drawn below) to answer the questions. Assume $H(x)$ has a vertical asymptote at $x = 4$. For each problem below, give the most complete answer; if the limit is infinite, indicate that with ∞ or $-\infty$. If a value does not exist, write DNE.



a. $f(0) =$ _____ **b.** $f(3) =$ _____ **c.** $f(5) =$ _____

d. $\lim_{x \to 0^-} f(x) =$ _____ **e.** $\lim_{x \to 0^+} f(x) =$ _____ **f.** $\lim_{x \to 0} f(x) =$ _____

g. $\lim_{x \to 4} f(x) =$ _____ **h.** $\lim_{x \to 5} f(x) =$ _____ **i.** $\lim_{x \to 6} f(x) =$ _____

j. List all x-values for which the function $H(x)$ fails to be continuous.

2. [10 points] Evaluate the following limits. Give the most complete answer; if the limit is infinite, indicate that with ∞ or $-\infty$. If a value does not exist, write DNE. You must show work to receive full credit.

a. $\lim_{x\to 4} \dfrac{x^2-3x-4}{x^2-16}$

b. $\lim_{x\to 1} \dfrac{2-\frac{2}{x}}{x-1}$

c. $\lim_{x\to 2^-} \dfrac{5x}{x-2}$

d. Given $\lim_{x\to 5} f(x) = 10$ and $\lim_{x\to 5} g(x) = -1$, evaluate $\lim_{x\to 5} 2\left(\dfrac{x+1}{f(x)+g(x)}\right)$.

3. [4 points] Use the Intermediate Value Theorem to show that the polynomial $p(x) = x^4 - 5x + 1$ must reach a y-value of -1 for some x-value on the interval $[0,1]$.