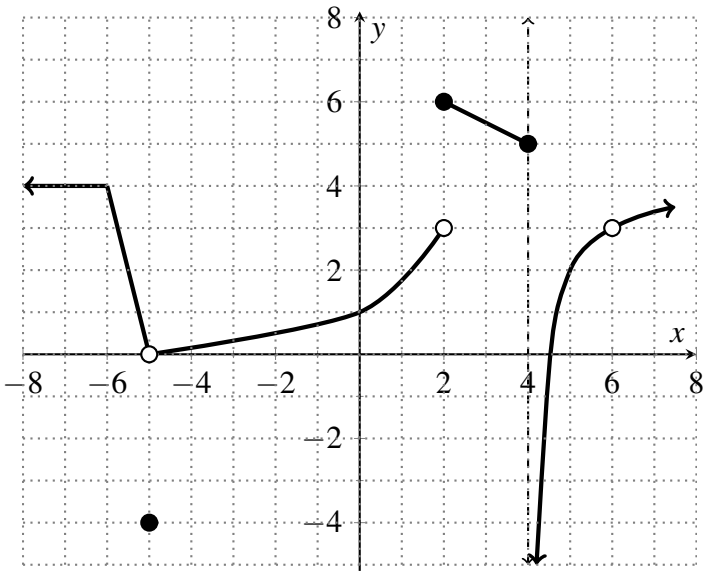
Name: _____ _____ **/ 25**

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

1. [2 points] Use the graph of the function of $f(x)$ to find **all** x-values where $f(x)$ fails to be continuous.



Answer: $x =$ _____

2. [4 points]

a. What is wrong with the following equation? $\dfrac{x^4-4x}{x} = x^3-4$

b. In view of part a, explain why the following equation is correct. $\lim\limits_{x\to 0}\dfrac{x^4-4x}{x} = \lim\limits_{x\to 0} x^3-4$

3. [4 points] Explain why the function $f(x) = \begin{cases} 3\cos x & x<0 \\ -2 & x=0 \\ 4x-2 & x>0. \end{cases}$ fails to be continuous at $x=0$.

4. [12 points] Evaluate each limit below, if it exists. Show your work to receive full credit. If the limit is infinite, say so; don't just write "DNE".

a. $\lim_{x\to -3} \dfrac{x^2+x-6}{15+2x-x^2}$.

b. $\lim_{h\to 5^-} \dfrac{h-5}{4|h|-20}$

c. $\lim_{x\to 3^-} \left(\dfrac{1}{x-3} - \dfrac{1}{x(x-3)}\right)$

5. [3 points] What property of the natural log function allows you to move the limit inside the function, as done below?

$$\lim_{x\to 5} \left(\ln\left(x^2+16\right)\right) = \ln\left(\lim_{x\to 5}(x^2+16)\right)$$