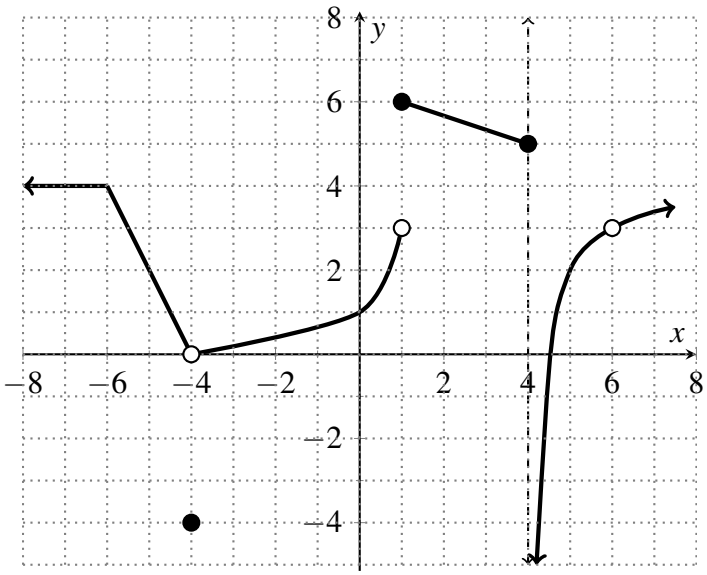
Name: _____ _____ **/ 25**

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? $\dfrac{x-4x^3}{x} = 1-4x^2$

b. In view of part a, explain why the following equation is correct. $\lim\limits_{x\to 0} \dfrac{x-4x^3}{x} = \lim\limits_{x\to 0} 1-x^2$

3. [4 points] Explain why the function $f(x) = \begin{cases} 4\sin x & x < 0 \\ 0 & x = 0 \\ 4x-2 & x > 0. \end{cases}$ 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. $\lim_{x\to 2} \dfrac{x^2+5x-14}{2+x-x^2}$.

b. $\lim_{h\to 10^-} \dfrac{2|h|-20}{h-10}$

c. $\lim_{x\to 5^+} \left(\dfrac{1}{x-5} - \dfrac{1}{x(x-5)}\right)$

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

$$\lim_{x\to 5} \sqrt{x^2+9} = \sqrt{\lim_{x\to 5}(x^2+9)}$$