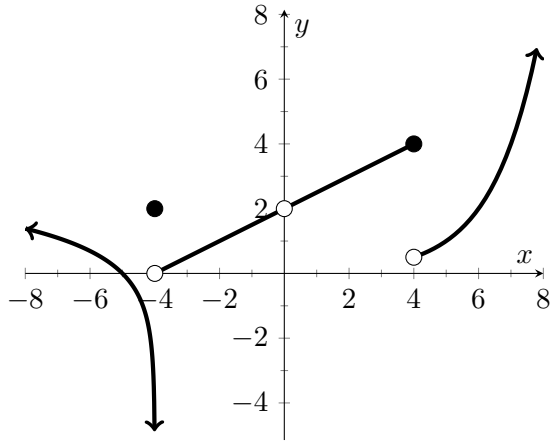
Math 251 Fall 2017 **Quiz #3, September 20**

Name: _____

There are 25 points possible on this quiz. This is a closed book quiz. Calculators and notes are not allowed. **Please show all of your work!** If you have any questions, please raise your hand.

Exercise 1. (5 pts.) Consider the function $f(x)$ with graph given below.



a.) List any values a where $\lim_{x\to a} f(x)$ fails to exist.

b.) List any values x where $f(x)$ fails to be continuous. Explain why the function is discontinuous at each such value a.

Exercise 2. (4 pts.) Evaluate $\lim_{x\to 4} \dfrac{x^2-3x-4}{4-x}$.

Exercise 3. (4 pts.) Evaluate $\lim_{h\to 0} \dfrac{\frac{1}{2+h}-\frac{1}{2}}{h}$.

Exercise 4. (5 pts.) Consider the function

$$f(x) = \begin{cases} x+1 & x < 1 \\ 5 & x = 1 \\ \frac{2}{x^2} & x > 1 \end{cases}$$

a.) Evaluate $\lim_{x \to 1} f(x)$.

b.) Explain why $f(x)$ fails to be continuous at $x = 1$.

Exercise 5. (4 pts.) Using complete sentences, explain why the function $f(x) = x^2 - 2 - \cos x$ has a zero on the interval $[0, \pi]$.

Exercise 6. (3 pts.) If $2x \leq g(x) \leq x^4 - x^2 + 2$ for all x, evaluate $\lim_{x \to 1} g(x)$. Justify your answer.