

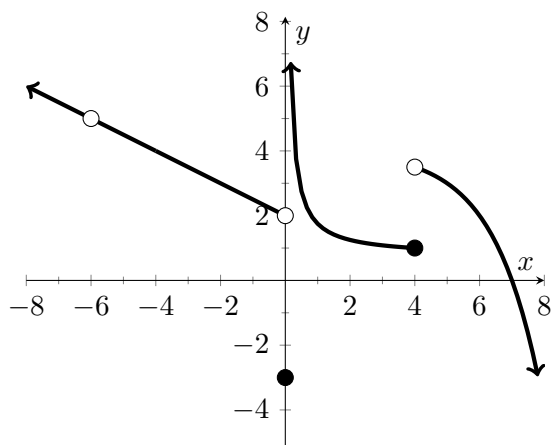
Math 251 Fall 2017

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 $\lim_{x \rightarrow a} f(x)$ 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 $\lim_{x \rightarrow 3} \frac{x^2 - 5x + 6}{3 - x}$.

Exercise 3. (4 pts.) Evaluate $\lim_{x \rightarrow 2} \frac{\frac{1}{4} - \frac{1}{2x}}{x - 2}$.

Exercise 4. (5 pts.) Consider the function

$$f(x) = \begin{cases} \frac{2}{x} & x < 2 \\ 3 & x = 2 \\ 3 - x & x > 2 \end{cases}$$

a.) Evaluate $\lim_{x \rightarrow 2} f(x)$.

b.) Explain why $f(x)$ fails to be continuous at $x = 2$.

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

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