

Name: _____

Math 105

Quiz #3

September 23, 2013

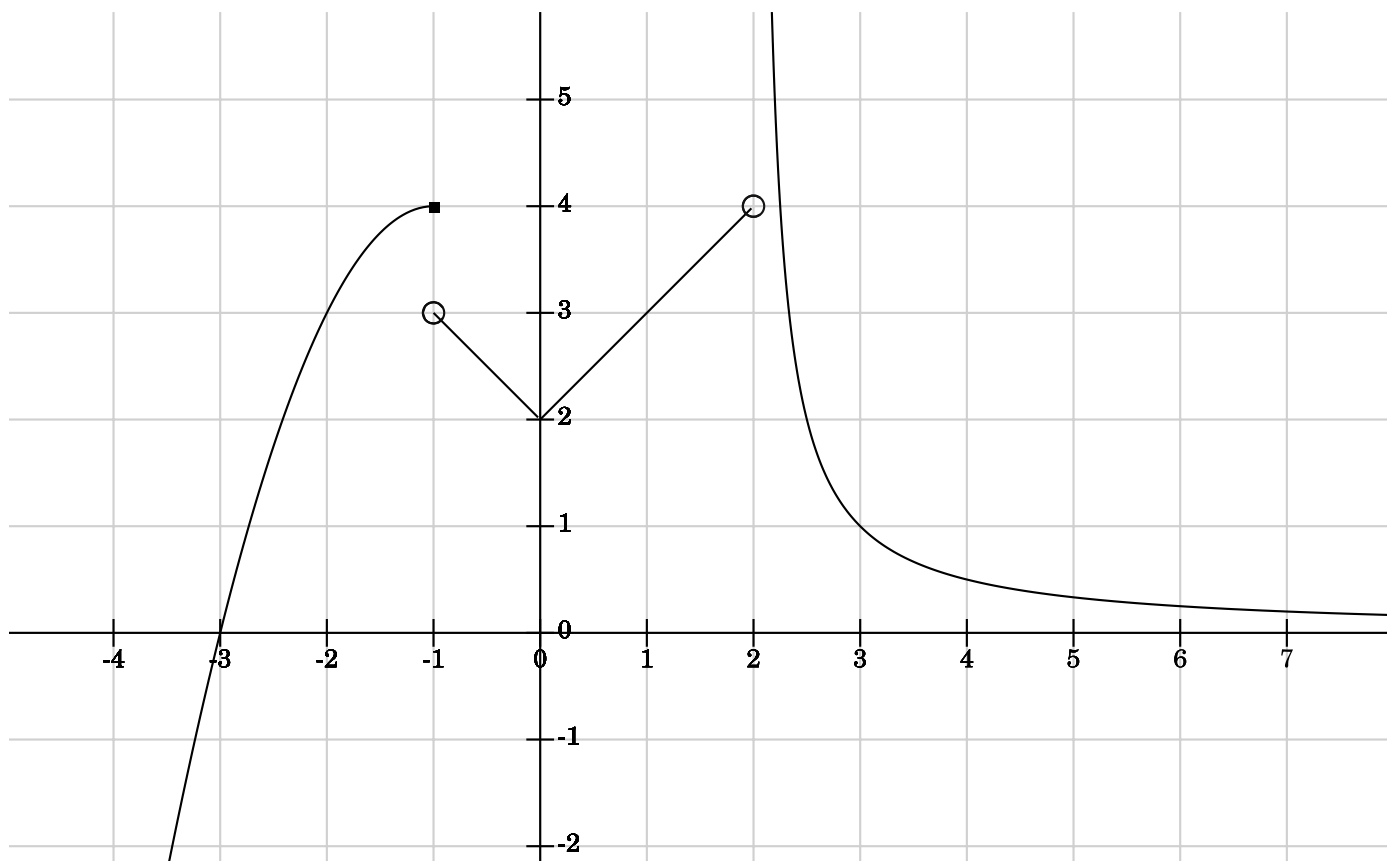
- This is a closed-book quiz. No books, notes, calculators, cell phones, communication devices of any sort, or webpages, or other aids are permitted.
- Please *show* all of your work and *justify* all of your answers.

1. [5 Points] Let $f(x) = \frac{1}{x^2}$. Compute and simplify $\frac{f(x+h) - f(x)}{h}$.

2. [5 Points] Consider the function defined piece-wise by $f(x) = \begin{cases} x+1 & \text{if } x < -1 \\ x^2 & \text{if } -1 \leq x < 1 \\ 2-x & \text{if } x \geq 1 \end{cases}$

Graph $f(x)$. **Then** use it to determine the values a for which $\lim_{x \rightarrow a} f(x)$ exists.

3. [5 Points] Consider the following graph of $f(x)$. Answer the questions below. Justify your answers when necessary.



(a) $\lim_{x \rightarrow 2^+} f(x) = \underline{\hspace{2cm}}$

(b) $\lim_{x \rightarrow 2^-} f(x) = \underline{\hspace{2cm}}$

(c) $\lim_{x \rightarrow 2} f(x) = \underline{\hspace{2cm}}$

(d) $\lim_{x \rightarrow -1} f(x) = \underline{\hspace{2cm}}$

(e) $\lim_{x \rightarrow 0} f(x) = \underline{\hspace{2cm}}$

4. [5 Points] Compute each of the following limits. Justify your answers. Be clear if the limit equals $+\infty$, $-\infty$, or Does Not Exist.

(a) $\lim_{x \rightarrow 7} \frac{x - 2}{x - 7}$

(b) $\lim_{x \rightarrow 3} \frac{x - 5}{x - 3}$

(b) $\lim_{x \rightarrow -2} \frac{x - 5}{x + 2}$