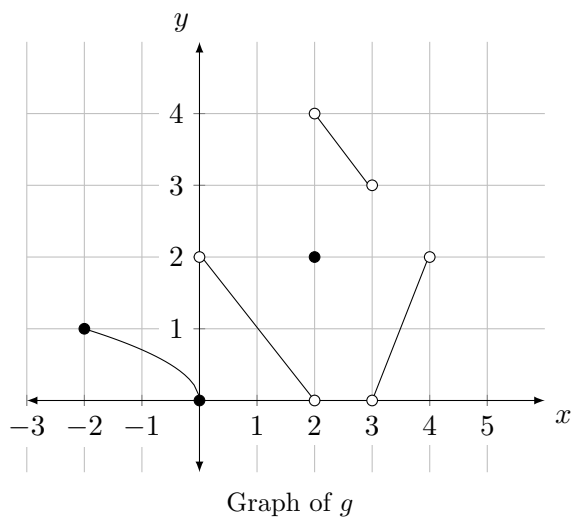


Name: _____

Mark: _____

Mini-math Div 3/4: Friday, September 16, 2022 (15 minutes)

1. Consider the below graph of a function $g(x)$.



- (a) (1 point) Determine $\lim_{x \rightarrow 2} g(x)$, if it exists. If it does not, explain why it does not.
- (b) (1 point) Determine $\lim_{x \rightarrow 2} g(g(x))$, if it exists. If it does not, explain why it does not.
2. (1 point) True or false: The value of $\lim_{x \rightarrow a} f(x)$ is $f(a)$, assuming $f(a)$ is defined.

3. (1 point) True or false: $\lim_{x \rightarrow a} f(x)$ can only exist if the left and right limits exist and are equal.

4. What method would you use to solve the following limits? (For extra practice, find the limit.)

(a) (1 point) $\lim_{h \rightarrow 0} \frac{(3+h)^2 - 9}{h}?$

(b) (1 point) $\lim_{x \rightarrow 4} \frac{\sqrt{8-x} - 2}{1 - \sqrt{5-x}}$

(c) (1 point) $\lim_{x \rightarrow 1} \frac{x^2 + 5x + 6}{x^2 - 5x + 6}$

(d) (1 point) $\lim_{x \rightarrow -4} \frac{x^2 + 3x - 4}{x|x+4|}$

5. (1 point) Suppose $g(x) \leq f(x) \leq h(x)$ for all x except for $x = a$. What additional conditions are necessary to guarantee that $\lim_{x \rightarrow a} f(x)$ exists?

6. (3 points) Where is the following function discontinuous? Identify the type of discontinuity, if any.

$$f(x) = \begin{cases} \frac{6}{x+3} & \text{if } x < 0 \\ 3 & \text{if } x = 0 \\ x+2 & \text{if } x > 0 \end{cases}$$