

Math 131 - Quiz 2

January 25, 2023

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (4.5 points) For each part of this problem, assume that $\lim_{x \rightarrow 2} f(x) = 3$, $\lim_{x \rightarrow 2} g(x) = 7$, and $\lim_{x \rightarrow 2} h(x)$ exists.

- (a) Evaluate $\lim_{x \rightarrow 2} [5f(x) - xg(x)]$.

$$\begin{aligned} & 5 \lim_{x \rightarrow 2} f(x) - \left(\lim_{x \rightarrow 2} x \right) \left(\lim_{x \rightarrow 2} g(x) \right) \\ & = 5(3) - (2)(7) = 15 - 14 = \boxed{1} \end{aligned}$$

- (b) Find $\lim_{x \rightarrow 2} h(x)$ if $\lim_{x \rightarrow 2} \frac{g(x)}{h(x)} = \frac{1}{2}$.

$$\frac{\lim_{x \rightarrow 2} g(x)}{\lim_{x \rightarrow 2} h(x)} = \frac{7}{\lim_{x \rightarrow 2} h(x)} = \frac{1}{2} \Rightarrow \boxed{\lim_{x \rightarrow 2} h(x) = 14}$$

- (c) Find $\lim_{x \rightarrow 2} h(x)$ if $\lim_{x \rightarrow 2} \frac{f(x)}{h(x)}$ does not exist.

$$\lim_{x \rightarrow 2} \frac{f(x)}{h(x)} = \frac{\lim_{x \rightarrow 2} f(x)}{\lim_{x \rightarrow 2} h(x)} = \frac{3}{\lim_{x \rightarrow 2} h(x)}$$

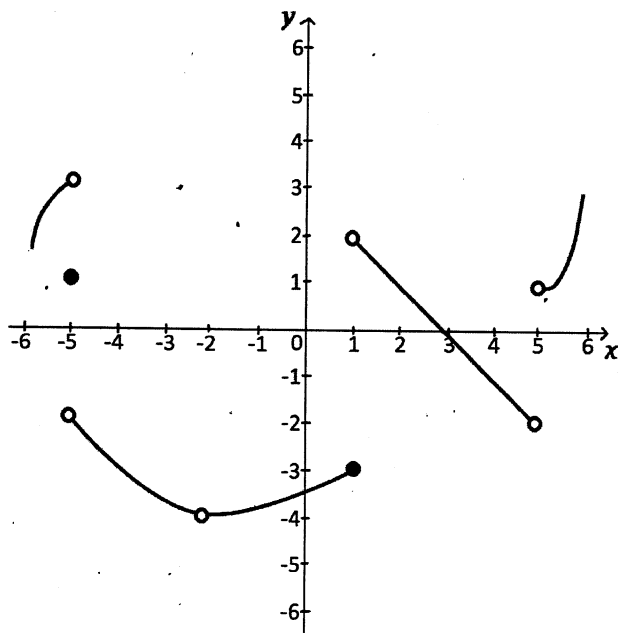
THE ONLY WAY THIS ISN'T TRUE

IS IF

$$\boxed{\lim_{x \rightarrow 2} h(x) = 0}$$

Turn over.

2. (5.5 points) The graph of $y = f(x)$ is shown below. Use the graph to estimate each limit or explain why the limit does not exist.



(a) $\lim_{x \rightarrow -6} f(x)$

DNE BECAUSE f IS NOT DEFINED
TO THE LEFT OF $x = -6$ (FAILURE #4)

(b) $\lim_{x \rightarrow 1} f(x)$

DNE BECAUSE THE LIMIT FROM THE
RIGHT IS NOT EQUAL TO THE LIMIT FROM
THE LEFT (FAILURE #1)

(c) $\lim_{x \rightarrow 3} f(x)$

= 0