Math 135, Calculus 1, Fall 2020

Weekly Quiz 10-07

Show all work: clearly indicate your answer and the reasoning used to arrive at the answer. Unsupported answers may not receive full credit.

Exercise 1. Let $f(x)$ be the function

$$f(x) = \begin{cases} 2x - 1 & \text{if } x < -1 \\ cx & \text{if } -1 \le x \le 2 \\ |x-2| & \text{if } x > 2. \end{cases}$$

(a) Find the value of c that makes $f(x)$ left-continuous.

<u>Want</u> $\lim_{x \to -1^-} f(x) = f(-1)$

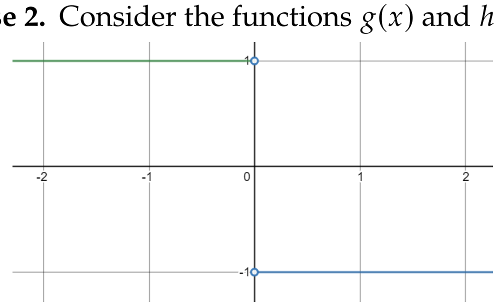
$\lim_{x \to -1^-} (2x-1) = -3$, $f(-1) = -c \Rightarrow \boxed{c = 3}$

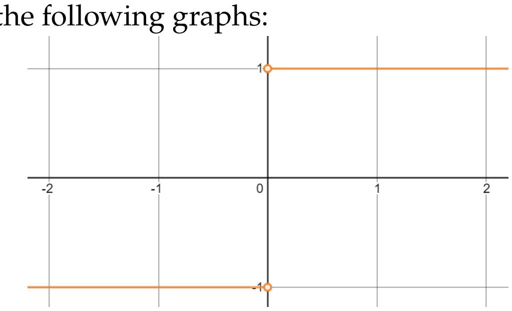
(b) Find the value of c that makes $f(x)$ right-continuous.

<u>Want</u> $\lim_{x \to 2^+} f(x) = f(2)$

$\lim_{x \to 2^+} (|x-2|) = 0$, $f(2) = 2c \Rightarrow \boxed{c = 0}$

Exercise 2. Consider the functions $g(x)$ and $h(x)$ with the following graphs:





Compute $\lim_{x \to 0}(g(x) + h(x))$.

- $\lim_{x \to 0^-} (g(x) + h(x)) = \lim_{x \to 0^-} g(x) + \lim_{x \to 0^-} h(x) = 1 + (-1) = 0$

- $\lim_{x \to 0^+} (g(x) + h(x)) = \lim_{x \to 0^+} g(x) + \lim_{x \to 0^+} h(x) = -1 + 1 = 0$

THUS the limit exists and equals $\boxed{0}$