Math 131 - Quiz 2
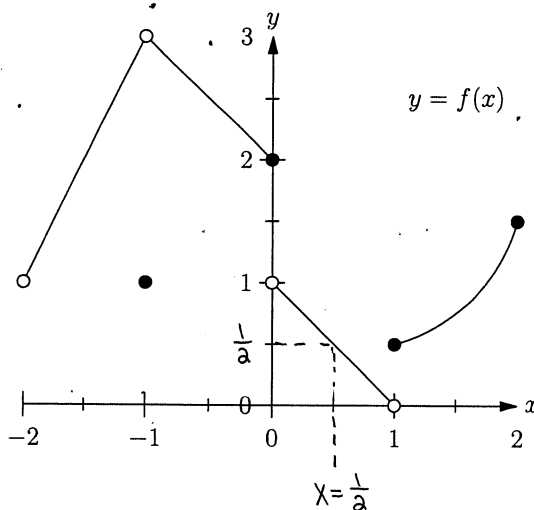
August 31, 2023

Name __key__

Score _____

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

1. (5 points) Referring to the graph shown below, determine each of the following or explain why it does not exist.

(a) $\lim\limits_{x \to -1} f(x) = 3$

(b) $\lim\limits_{x \to -2} f(x)$ DNE BECAUSE f IS NOT DEFINED TO THE LEFT OF $X = -2$ (FAILURE #4).

(c) $\lim\limits_{x \to 1} f(x)$ DNE. LIMIT FROM LEFT $= 0 \neq \frac{1}{2} =$ LIMIT FROM RIGHT (FAILURE #1)

(d) $\lim\limits_{x \to 1/2} f(x) = \dfrac{1}{2}$

(e) $f(-1) = 1$

Turn over.

2. (3 points) Suppose that $\lim\limits_{x\to 2} f(x) = 3$ and $\lim\limits_{x\to 2} g(x) = -7$. Find each limit. Show work or explain your reasoning.

(a) $\lim\limits_{x\to 2} [4f(x) - 2g(x)]$

$$= 4 \lim\limits_{x\to a} f(x) - 2 \lim\limits_{x\to a} g(x)$$

$$= 4(3) - 2(-7) = 12 + 14 = \boxed{26}$$

(b) $\lim\limits_{x\to 2} \dfrac{x^2 f(x)}{g(x) - 7}$ $= \dfrac{\left(\lim\limits_{x\to a} x^2\right)\left(\lim\limits_{x\to a} f(x)\right)}{\lim\limits_{x\to a} g(x) - 7} = \dfrac{4 \cdot 3}{(-7) - 7} = \dfrac{12}{-14}$

$$= \boxed{-\dfrac{6}{7}}$$

3. (1 point) Evaluate the limit: $\lim\limits_{x\to \pi/3} [6\cos x]$

$$= 6 \cos \dfrac{\pi}{3} = 6\left(\dfrac{1}{2}\right) = \boxed{3}$$

DIRECT SUBS.

4. (1 point) Explain why direct substitution cannot be used to evaluate $\lim\limits_{x\to \pi/2} \tan x$.

TAN $\dfrac{\pi}{2}$ IS NOT DEFINED.