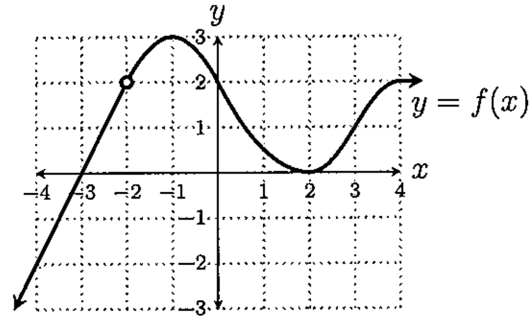
Name: Richard

QUIZ 1

MATH 200

August 24, 2023

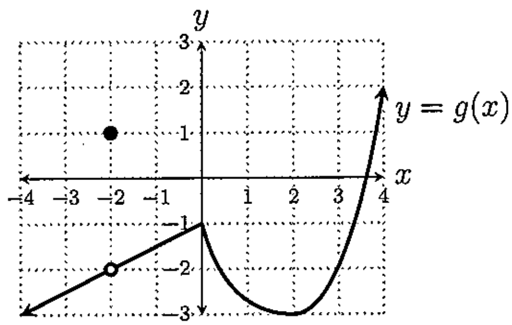
1. Answer the questions about the functions graphed below.



(a) $g(f(-4)) = g(-2) = \boxed{1}$

(b) $\lim\limits_{x \to 2} f(x) = \boxed{0}$

(c) $\lim\limits_{x \to -2} g(x) = \boxed{-2}$



(d) $\lim\limits_{x \to 3} \left(2f(x) - g(x)\right) = 2f(3) - g(3)$
$= 2 \cdot 1 - (-2) = \boxed{4}$

(e) $\lim\limits_{x \to -2} \dfrac{3 + f(x)}{\sqrt{7 + g(x)}} = \dfrac{3+2}{\sqrt{7+(-2)}} = \dfrac{5}{\sqrt{5}} = \boxed{\sqrt{5}}$

2. $\lim\limits_{x \to 3} \sqrt{\dfrac{x-1}{3} - \dfrac{5}{3x}} = \sqrt{\lim\limits_{x \to 3}\left(\dfrac{x-1}{3} - \dfrac{5}{3x}\right)} = \sqrt{\dfrac{3-1}{3} - \dfrac{5}{3 \cdot 3}} = \sqrt{\dfrac{2}{3} - \dfrac{5}{9}}$
$= \sqrt{\dfrac{2 \cdot 3}{3 \cdot 3} - \dfrac{5}{9}} = \sqrt{\dfrac{6}{9} - \dfrac{5}{9}} = \sqrt{\dfrac{1}{9}} = \dfrac{\sqrt{1}}{\sqrt{9}} = \boxed{\dfrac{1}{3}}$

3. $\lim\limits_{x \to 1/3} \dfrac{8^x}{6x+1} = \dfrac{8^{1/3}}{6 \cdot \frac{1}{3} + 1} = \dfrac{\sqrt[3]{8}}{2+1} = \boxed{\dfrac{2}{3}}$

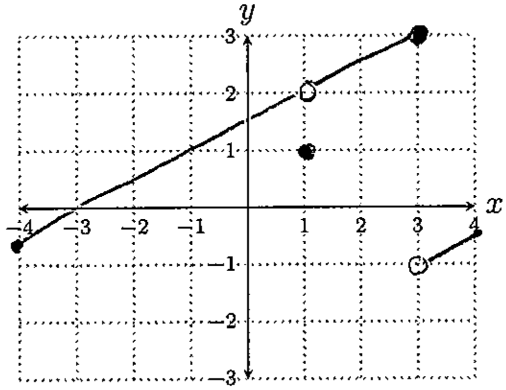
4. Draw the graph of **one** function f, with domain $[-4, 4]$, meeting the following conditions.

(a) $\lim\limits_{x \to 1} f(x) = 2$

(b) $f(1) = 1$

(c) $\lim\limits_{x \to 3^-} f(x) = 3$

(d) $\lim\limits_{x \to 3^+} f(x) = -1$



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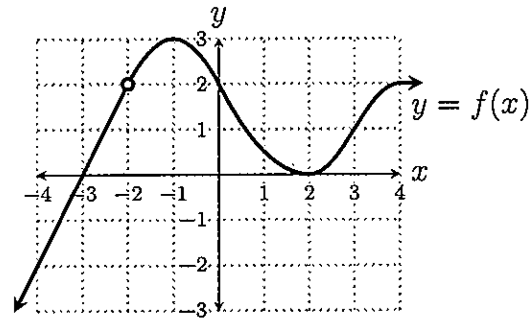
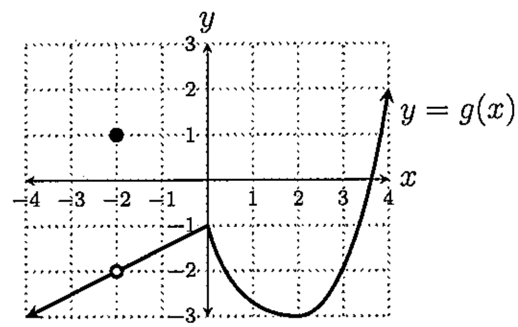
1. Answer the questions about the functions graphed below.



(a) $f(g(-4)) = f(-3) = \boxed{0}$

(b) $\lim_{x \to 2} g(x) = \boxed{-3}$

(c) $\lim_{x \to -2} f(x) = \boxed{2}$



(d) $\lim_{x \to 3} (2f(x) + 5g(x)) = 2f(3) + 5g(3)$
$= 2 \cdot 1 + 5 \cdot (-2) = \boxed{-8}$

(e) $\lim_{x \to -2} \dfrac{\sqrt{7 + g(x)}}{3 + f(x)} = \dfrac{\sqrt{7 + (-2)}}{3 + 2} = \boxed{\dfrac{\sqrt{5}}{5}}$

2. $\lim_{x \to 1/3} \dfrac{27^x}{1 - x} = \dfrac{27^{1/3}}{1 - 1/3} = \dfrac{\sqrt[3]{27}}{\frac{2}{3}} = \dfrac{3}{2/3} = \boxed{\dfrac{9}{2}}$

3. $\lim_{x \to 3} \sqrt{\dfrac{2}{3} - \dfrac{5}{3x}} = \sqrt{\lim_{x \to 3} \left(\dfrac{2}{3} - \dfrac{5}{3x}\right)} = \sqrt{\dfrac{2}{3} - \dfrac{5}{3 \cdot 3}} = \sqrt{\dfrac{2}{3} \cdot \dfrac{3}{3} - \dfrac{5}{3 \cdot 3}}$
$= \sqrt{\dfrac{6}{9} - \dfrac{5}{9}} = \sqrt{\dfrac{1}{9}} = \dfrac{\sqrt{1}}{\sqrt{9}} = \boxed{\dfrac{1}{3}}$

4. Draw the graph of **one** function f, with domain $[-4, 4]$, meeting the following conditions.

(a) $\lim_{x \to -3} f(x) = 0$

(b) $f(-3) = 2$

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

(d) $\lim_{x \to 1^+} f(x) = -1$