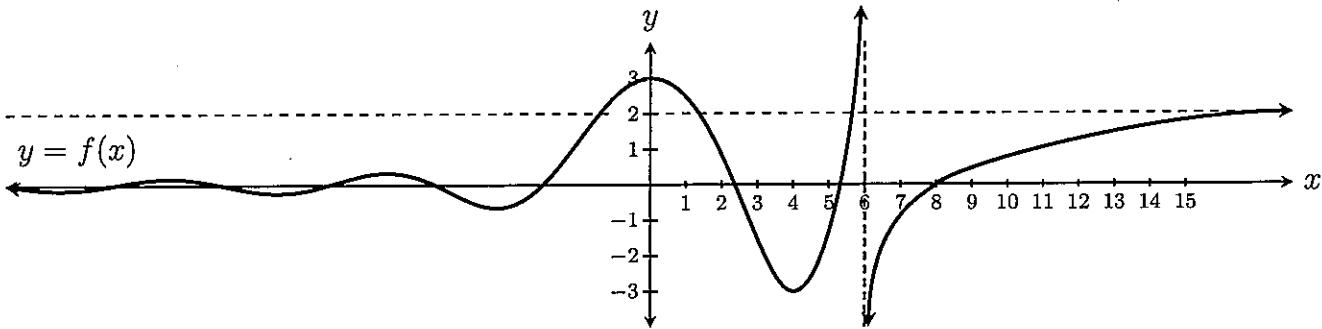


Directions: Find the limits. Show all steps. Simplify your answer.

1. (8 points) Answer the following questions about the function
- $y = f(x)$
- graphed below.



(a)  $\lim_{x \rightarrow -\infty} f(x) = \boxed{0}$

(b)  $\lim_{x \rightarrow \infty} f(x) = \boxed{2}$

(c)  $\lim_{x \rightarrow 6^-} f(x) = \boxed{\infty}$

(d)  $\lim_{x \rightarrow 6^+} f(x) = \boxed{-\infty}$

(e)  $\lim_{x \rightarrow 0} \frac{1}{f(x) - 3} = \boxed{-\infty}$   
Approaching 0 negative

(f)  $\lim_{x \rightarrow 6} \frac{1}{f(x)} = \boxed{0}$   
Approaching ±∞

(g)  $\lim_{x \rightarrow 8^-} \frac{1}{f(x)} = \boxed{-\infty}$   
Approaching 0 negative

(h)  $\lim_{x \rightarrow 8^+} \frac{1}{f(x)} = \boxed{\infty}$   
Approaching 0 positive

2. (4 points)  $\lim_{x \rightarrow \infty} e^{1/x} = e^{\lim_{x \rightarrow \infty} \frac{1}{x}} = e^0 = \boxed{1}$

3. (4 points)  $\lim_{x \rightarrow \infty} \frac{x^2 + 2x + 1}{-x^2 + 4x + 5} = \lim_{x \rightarrow \infty} \frac{\frac{x^2 + 2x + 1}{x^2}}{\frac{-x^2 + 4x + 5}{x^2}} = \lim_{x \rightarrow \infty} \frac{1 + \frac{2}{x} + \frac{1}{x^2}}{-1 + \frac{4}{x} + \frac{5}{x^2}} = \frac{1 + 0 + 0}{-1 + 0 + 0} = \frac{1}{-1} = \boxed{-1}$

4. (4 points)  $\lim_{x \rightarrow 5^+} \frac{x^2 + 2x + 1}{-x^2 + 4x + 5} = \lim_{x \rightarrow 5^+} \frac{(x+1)(x+1)}{(-x-1)(x+5)} = \lim_{x \rightarrow 5^+} \frac{-(x+1)}{x-5}$   
 $\begin{aligned} &= \lim_{x \rightarrow 5^+} \frac{-x-1}{x+5} \quad \text{Approaching } -6 \\ &\qquad\qquad\qquad \text{Approaching 0, positive} \end{aligned}$

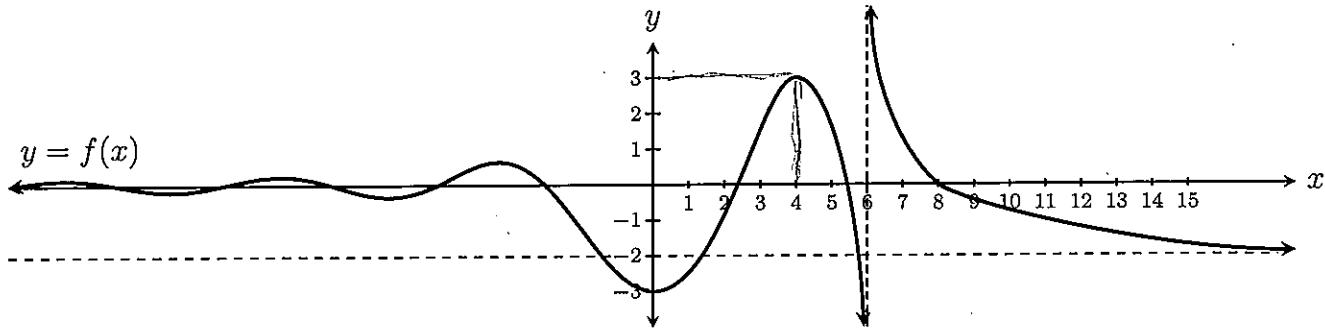
Name: Richard

## QUIZ 4 ♠

MATH 200  
September 5, 2023

Directions: Find the limits. Show all steps. Simplify your answer.

1. (8 points) Answer the following questions about the function
- $y = f(x)$
- graphed below.



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

(b)  $\lim_{x \rightarrow 6^+} f(x) =$

(c)  $\lim_{x \rightarrow -\infty} f(x) =$

(d)  $\lim_{x \rightarrow \infty} f(x) =$

(e)  $\lim_{x \rightarrow 8^-} \frac{1}{f(x)} =$   approaching 0, pos,

(f)  $\lim_{x \rightarrow 8^+} \frac{1}{f(x)} =$   approaching 0, negative

(g)  $\lim_{x \rightarrow 6} \frac{1}{f(x)} =$

(h)  $\lim_{x \rightarrow 4} \frac{1}{f(x) - 3} =$

2. (4 points)  $\lim_{x \rightarrow \infty} \ln\left(\frac{1}{x}\right) =$

approaching 0

approaching 5

3. (4 points)  $\lim_{x \rightarrow 3^+} \frac{x^2 + 5x + 6}{x^2 - 9} = \lim_{x \rightarrow 3^+} \frac{(x+2)(x+3)}{(x+3)(x-3)} = \lim_{x \rightarrow 3^+} \frac{x+2}{x-3} =$

Approaching 0, pos,

4. (4 points)  $\lim_{x \rightarrow \infty} \frac{x^2 + 5x + 6}{x^2 - 9} = \lim_{x \rightarrow \infty} \frac{x^2 + 5x + 6}{x^2 - 9} \cdot \frac{\frac{1}{x^2}}{\frac{1}{x^2}} = \lim_{x \rightarrow \infty} \frac{1 + \frac{5}{x} + \frac{6}{x^2}}{1 - \frac{9}{x^2}}$   
 $= \frac{1+0+0}{1-0} =$