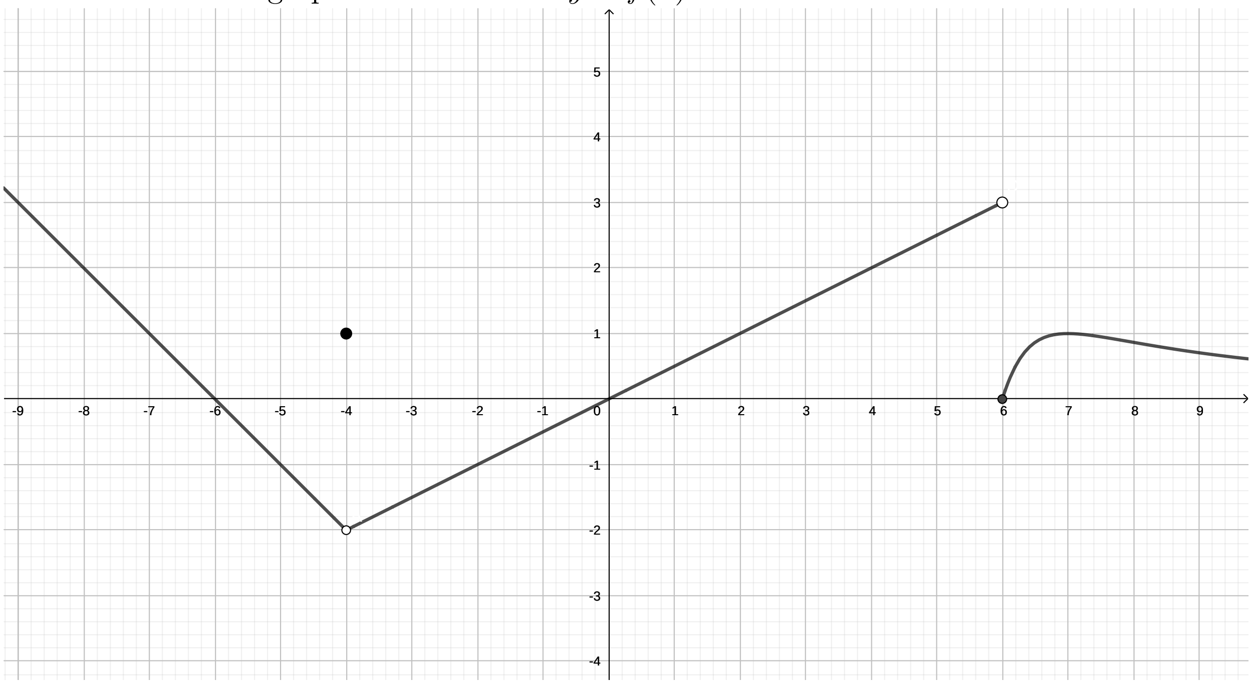
In-class Activity 1

Limits

LAST NAME: ________________ FIRST NAME: ________________

Question 1
Given below is the graph of the function $y = f(x)$.



Compute the following quantities if they exist, or write "Does not exist" and justify why:

- $f(-4) =$
- $f(6) =$
- $f(0) =$
- $\lim_{x\to -4^+} f(x) =$
- $\lim_{x\to 6^-} f(x) =$
- $\lim_{x\to 0^-} f(x) =$
- $\lim_{x\to -4^-} f(x) =$
- $\lim_{x\to 6^+} f(x) =$
- $\lim_{x\to 0^+} f(x) =$
- $\lim_{x\to -4} f(x) =$
- $\lim_{x\to 6} f(x) =$
- $\lim_{x\to 0} f(x) =$

Question 2
Given the function:

$$f(x) = \begin{cases} x^3 - x + 1 & \text{if} \quad x < 1 \\ \frac{3}{x} & \text{if} \quad x \geq 1, \end{cases}$$

compute the following quantities if they exists, or write "Does not exist" and explain why:

- $f(2) =$
- $f(1) =$
- $\lim_{x\to 2} f(x) =$
- $\lim_{x\to 1} f(x) =$

Question 3 Compute the following limits if they exist, or write "Does not exist" and justify why:

(1) $\lim_{x \to 0} \frac{x^3}{x^3 + x^4} =$

(2) $\lim_{u \to 7} \frac{49 - u^2}{2u - 14} =$

(3) $\lim_{x \to -2} \frac{x^3 + 8}{x^2 + 2x} =$

(4) $\lim_{x \to 0} \frac{\sqrt{25 + x} - 5}{x^2 - 5x} =$

(5) $\lim_{x \to 9} \frac{9 - x}{3 - \sqrt{x}} =$

(6) $\lim_{t \to 0} \frac{\sqrt{t + 1} - \sqrt{1 - t}}{t} =$

(7) $\lim_{t \to 3} \frac{\frac{1}{t} - \frac{1}{3}}{t - 3} =$

(8) $\lim_{h \to 0} \frac{h^2}{\frac{1}{h+1} - 1} =$