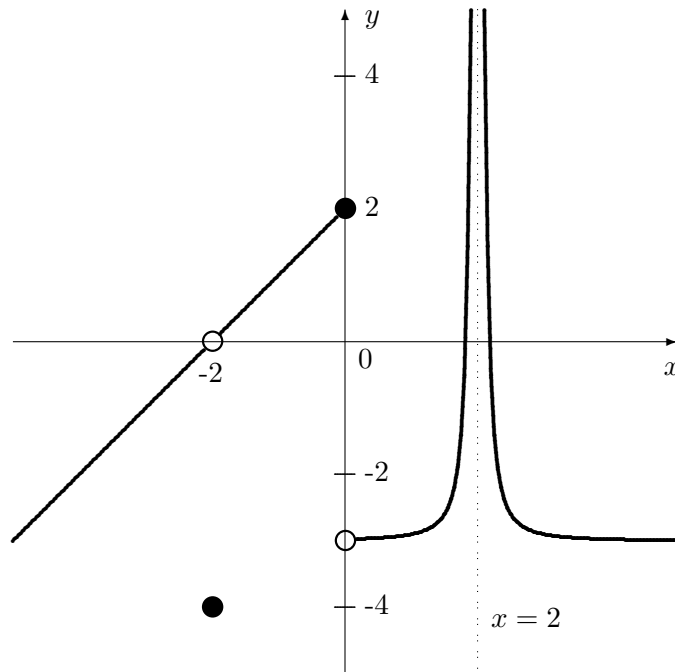


Name

MUN Number

- [12] 1. Use the graph of  $y = f(x)$  below to determine each of the following. Label the limits as  $\infty$  or  $-\infty$  where appropriate. If the limit does not exist or the value of the function is undefined, indicate this.



(a)  $f(-2) =$

(b)  $\lim_{x \rightarrow -2^-} f(x) =$

(c)  $\lim_{x \rightarrow -2^+} f(x) =$

(d)  $\lim_{x \rightarrow -2} f(x) =$

(e)  $f(2) =$

(f)  $\lim_{x \rightarrow 2^-} f(x) =$

(g)  $\lim_{x \rightarrow 2^+} f(x) =$

(h)  $\lim_{x \rightarrow 2} f(x) =$

(i)  $f(0) =$

(j)  $\lim_{x \rightarrow 0^-} f(x) =$

(k)  $\lim_{x \rightarrow 0^+} f(x) =$

(l)  $\lim_{x \rightarrow 0} f(x) =$

[16] 2. Determine each of the following limits. If a limit does not exist, explain why.

(a)  $\lim_{x \rightarrow 0} \frac{\sin^2(3x)}{x \sin(4x)}$

(b)  $\lim_{x \rightarrow -3} f(x)$  where  $f(x) = \begin{cases} \frac{6x + 18}{9 - x^2}, & \text{for } x \leq -3 \\ \frac{3 - 5x}{9 + x^2}, & \text{for } x > -3 \end{cases}$

(c)  $\lim_{x \rightarrow 2} \frac{x^2 - 2x}{3x - \sqrt{7x^2 + 8}}$

- [8] 3. Determine all the vertical asymptotes, if any, of the function

$$f(x) = \frac{3 - 2x}{2x^2 - 5x + 3}.$$

For each vertical asymptote, assign  $\pm\infty$  to the lefthand and righthand limits.

- [4] 4. Consider the functions

$$f(x) = \frac{x^2 - 9}{x - 3} \quad \text{and} \quad g(x) = x + 3.$$

(a) Is the statement “ $f(x) = g(x)$ ” true or false? Briefly explain your answer.

(b) Is the statement “ $\lim_{x \rightarrow 3} f(x) = \lim_{x \rightarrow 3} g(x)$ ” true or false? Briefly explain your answer. If your answer is different from that of part (a), be sure to indicate how this is possible.