

5. [8 points] The function $k(x)$ is given by the following formula, where A and B are positive constants:

$$k(x) = \begin{cases} 3 + e^{x-1} & x \leq 1 \\ \frac{2x^2 + 5x + 1}{Ax^2 + 1} & 1 < x < 2 \\ \ln(Bx) + 3 & x \geq 2. \end{cases}$$

- a. [2 points] Evaluate each of the expressions below. If a limit does not exist, including if it diverges to ∞ or $-\infty$, write DNE. You do not need to show work.

$$\lim_{x \rightarrow -\infty} k(x)$$

$$\lim_{x \rightarrow \infty} k(x)$$

Answer: _____

Answer: _____

- b. [2 points] Find all horizontal and vertical asymptotes of $k(x)$ or write NONE if there are none.

Answer: Horizontal: _____

Vertical: _____

- c. [4 points] Find all values of A and B so that

- $k(x)$ is continuous at $x = 1$ and also
- $k(x)$ is continuous at $x = 2$.

Write NONE if there are no such values. Show your work.

Answer: $A =$ _____ and $B =$ _____