

2. [6 points] Let  $A$  and  $B$  be constants and

$$k(x) = \begin{cases} 3x + \frac{B}{x} & \text{for } 0 < x < 1 \\ Bx^2 + Ax^3 & \text{for } 1 \leq x. \end{cases}$$

Find the values of  $A$  and  $B$  that make the function  $k(x)$  differentiable on  $(0, \infty)$ . Show all your work to justify your answers. If there are no such values of  $A$  and  $B$ , write NONE.

**Answer:**  $A =$  \_\_\_\_\_  $B =$  \_\_\_\_\_