

Problem statement Suppose $f(x)$ is a piecewise function defined as follows:

$$f(x) = \begin{cases} 2x^2 + 2, & \text{if } x < 1 \\ ax^2 + bx, & \text{if } 1 \leq x \leq 2 \\ 2 - \frac{6}{x}, & \text{if } x > 2 \end{cases}.$$

- a) Suppose that $a = 2$ and $b = -3$. Graph $f(x)$ for $0 \leq x \leq 3$. Find the left and right hand limits of $f(x)$ as x approaches 1 and as x approaches 2.
- b) Find a and b so that the graph of $f(x)$ doesn't have any jumps (that is, $f(x)$ is continuous everywhere). Graph the resulting function $f(x)$ for $0 \leq x \leq 3$.