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 $0 \leq x \leq 3$. 