

6. (10 points) A quantity has density function $p(x)$, where

$$p(x) = \begin{cases} 0 & \text{when } x < 0, \\ a + bx^2 & \text{when } 0 \leq x \leq 1, \\ 0 & \text{when } x > 1. \end{cases}$$

Assuming that the mean value of the quantity is $\frac{3}{4}$, find a and b . Show your work.