8. [12 points] Let $p(x)$ be the probability density function given by

$$p(x) = \begin{cases} \dfrac{c}{x^2} & \text{for } x \leq -1 \\ c & \text{for } -1 < x < 1 \\ \dfrac{c}{x^2} & \text{for } x \geq 1. \end{cases}$$

for some value c.

a. [5 points] Find the value of c. Justify your answer. Any integrals must be computed by hand.

Answer: $c =$ _____

b. [4 points] Find a piecewise-defined formula for $P(x)$, the cumulative density function for x.

c. [3 points] Show that there is no mean value of x.