

10. [10 points] Suppose $Q(x)$ is the cumulative distribution function (cdf) for a variable x , such that

$$Q(x) = \begin{cases} a & \text{for } x \leq 0 \\ b - e^{-cx} & \text{for } x > 0, \end{cases}$$

and the median value of x is 2.

- a. [2 points] Let $q(x)$ be the probability density function for x . Write a formula for $q(x)$, assuming $q(0) = 0$.

Answer:

- b. [4 points] Set up, but do not evaluate, an expression involving one or more integrals that represents the mean value of x . Your answer may contain a , b , or c , but should not contain any function names (such as Q or q).

Answer: _____

- c. [4 points] Find the values of a , b , and c . Justify your answers, and write them in exact form. Remember that the median value of x is 2.

Answer: $a =$ _____ $b =$ _____ $c =$ _____