

5. [7 points] The Terrible Telemarketing corporation has realized that people often hang up on their telemarketing calls. After collecting data they found that the probability that someone will hang up the phone at time t seconds after the call begins is given by the probability density function $p(t)$. The formula for $p(t)$ is given below.

$$p(t) = \begin{cases} 0 & t < 0 \\ te^{-ct^2} & t \geq 0 \end{cases}$$

- a. [5 points] Find the value of c so that $p(t)$ is a probability density function.
- b. [2 points] What is the probability that someone will stay on the phone with a telemarketer for more than 4 seconds?

6. [6 points] Consider the probability density function $q(t)$ shown below.

$$q(t) = \begin{cases} 0 & t < 0 \\ \frac{t}{2} & 0 \leq t < 2 \\ 0 & t \geq 2 \end{cases}$$

- a. [4 points] What is the cumulative distribution function $Q(t)$ of the density given by $q(t)$? Write your final answer in the answer blanks provided.

If $t < 0$ then $Q(t) =$ _____

If $0 \leq t < 2$ then $Q(t) =$ _____

If $t \geq 2$ then $Q(t) =$ _____

- b. [2 points] What is the ~~median~~^{mean} of the distribution?