

7. [16 points] Gabriel the aspiring jazz musician owns a number of cats and kittens which he lets wander his neighborhood. When he wants to feed them, he blows his trusty cat trumpet, and waits for them to come running.

- a. [6 points] The probability density function for the time t , in minutes, that it takes for Miles the cat to arrive is given by $m(t)$ where

$$m(t) = \begin{cases} 0 & \text{for } t < 0 \\ \frac{1}{5} & \text{for } 0 \leq t \leq a \\ \frac{1}{5}e^{-t+a} & \text{for } t > a \end{cases}$$

for some constant a . Find the value of a .

Answer: _____

- b. [7 points] Find the mean time in minutes that it takes Miles to arrive. You should evaluate any integrals or limits in your expression. You may give your answer in terms of a , but not in terms of m . You are not required to simplify your answer.

Answer: _____

- c. [3 points] The cumulative distribution function for the amount of time that it takes for Ella the kitten to arrive is given by $E(t)$. Gabriel knows that 18% of the time Ella arrives in less than 2 minutes, and that 40% of the time she takes more than 6 minutes to arrive. Use this information to find the value of $E(6) - E(2)$.

Answer: _____