

5. [10 points] You are at a bus stop waiting for a bus to arrive. The cumulative distribution function for the time, in minutes, a passenger will wait for the next bus to arrive is given by

$$P(t) = \begin{cases} 0 & t \leq 0 \\ 1 - e^{-0.05t} & t > 0. \end{cases}$$

- a. [3 points] What is the median amount of time that a passenger has to wait for a bus to arrive? Provide an **exact** answer. Remember to show all your work.

Answer: Median = _____

You decide that you are going to take the 2nd bus that arrives. It can be shown that the number of minutes a passenger has to wait for 2 buses to arrive has probability density function

$$q(t) = \begin{cases} 0 & t \leq 0 \\ Cte^{-0.05t} & t > 0 \end{cases}$$

for some constant C .

- b. [5 points] Find the value of C . **Show all your work using correct notation.** Any evaluation of integrals must be done **without a calculator**.

Answer: $C =$ _____

- c. [2 points] Write an expression (possibly involving one or more integrals) for the mean number of minutes it takes for 2 buses to arrive. (You do not need to evaluate your expression.)

Answer: Mean = _____