



STEP II, 1998, Q13

- 13 A random variable X has the probability density function

$$f(x) = \begin{cases} \lambda e^{-\lambda x} & x \geq 0, \\ 0 & x < 0. \end{cases}$$

Show that

$$P(X > s + t | X > t) = P(X > s).$$

The time it takes an assistant to serve a customer in a certain shop is a random variable with the above distribution and the times for different customers are independent. If, when I enter the shop, the only two assistants are serving one customer each, what is the probability that these customers are both still being served at time t after I arrive?

One of the assistants finishes serving his customer and immediately starts serving me. What is the probability that I am still being served when the other customer has finished being served?



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