Exercise M01

1. The probability density function governing the minutes of time t spent waiting outside a telephone box is given by $f(t) = ae^{-at}$.

(a) Determine the probability of having to wait for more than t minutes.

(b) Show that the probability of having to wait *more than* $2t$ minutes, given that you have waited for t, is the same as the unconditional probability of having to wait more than t minutes.

What are the implications of this result?

2. Prove that the function $f(x) = \frac{1}{4}(\frac{3}{4})^x$; $x = 0, 1, 2, \ldots$, constitutes a probability mass function. What is the probability that x will assume any integer value from 0 to 3. Find the value of n such that $P(x < n) = 0.9$ approximately.