1. (Textbook) Exercise 2.10

2. (Ross, Intro. Prob. Models, 10\textsuperscript{th} Edition) Let \{N(t), t \geq 0\} be a Poisson process with rate \(\lambda\). For \(s < t\), find
   
   a. \(P\{N(t) > N(s)\}\),
   
   b. \(P\{N(s) = 0 \mid N(t) = 3\}\),
   
   c. \(E\{N(t) \mid N(s) = 4\}\),
   
   d. \(E\{N(s) \mid N(t) = 4\}\).

3. (Ross, Intro. Prob. Models, 10\textsuperscript{th} Edition) Let \(X\) and \(Y\) be independent exponential random variables with respective rates \(\lambda\) and \(\mu\). Let \(M = \min(X, Y)\). Find
   
   a. \(E\{MX \mid M = X\}\),
   
   b. \(E\{MX \mid M = Y\}\),
   
   c. \(\text{Cov}(X, M)\).

   Hint: Consider modeling \(X\) and \(Y\) as two processes generated from a mother Poisson process.

4. (Ross, Intro. Prob. Models, 10\textsuperscript{th} Edition) Cars pass a certain street location according to a Poisson process with rate \(\lambda\). A woman who wants to cross the street at that location waits until she can see that no cars will come by in the next \(T\) time units.
   
   a. Find the probability that her waiting time is 0.
   
   b. Find her expected waiting time.

   Hint: Check page 95 of textbook for the definition of \(X^*\).

5. (Textbook) Exercise 2.12

6. (Textbook) Exercise 2.23 parts a, b and c.

7. (Ross, Intro. Prob. Models, 10\textsuperscript{th} Edition) Let \{N(t), t \geq 0\} be a non-homogeneous Poisson process with mean value function \(m(t) = \int_0^t \lambda(t')dt'\). Given \(N(t) = n\), show that the unordered set of arrival times has the same distribution as \(n\) independent and identically distributed random variables having the distribution function
   
   \[ F(x) = \begin{cases} 
   \frac{m(x)}{m(t)} & x \leq t \\
   1 & x > t 
   \end{cases} \]

   Hint: Extend the proof given for the homogeneous process.