STAT/MA 41600
In-Class Problem Set #33: November 1, 2017

1. Suppose that the times between consecutive cars are independent Exponential random variables, with expected time of 30 seconds between consecutive cars. Find the probability that the second car will pass within the next 1 minute.

2. A restaurant reviewer goes to a restaurant once per week, for a total of four weeks. He assumes that each of his waiting times to be seated is an Exponential random variable, with an average of 3 minutes waiting per week. He also assumes that the wait times are independent from week to week. What is the probability that he spends at least 10 minutes waiting altogether, during the four visits?

3a. Let X be the total time *in hours* necessary for the next 100 cars to pass, using the assumptions from question 1, namely, that the times between consecutive cars are independent Exponential random variables that each have expected time of 30 seconds. Find the variance of X.

3b. What is the variance of the time (in minutes) spent waiting (altogether) in question 2?

4. Review question: Consider a collection of 10 yellow bears, 10 blue bears, and 10 red bears. Randomly put these bears into 10 groups of three bears each. Let X denote the number of groups that contain three red bears.
4a. Find $\mathbb{E}(X)$.
4b. Find $\text{Var}(X)$.