STAT/MA 41600
In-Class Problem Set #18: September 27, 2017

1. Suppose that bikers pass in front of the Memorial Union at an average rate of 2 per minute (i.e., at an average rate of 1 biker per 30 seconds).
1a. What is the probability that at least 1 biker passes in front of the Memorial Union during the next 15 seconds?
1b. What is the probability that at least 4 bikers pass in front of the Memorial Union during the next 5 minutes?

2. If X has a Poisson distribution with mean 5, find the conditional probability that X is at most 5, given that X is at least 1.

3. Let X denote the number of bikers that pass in front of the Memorial Union during the next 1 minute (using the assumptions from question 1). Let Y denote the number of coin flips needed, in a sequence of flips, until the first head appears. Please assume that X and Y are independent. Find the probability that $Y \geq X$. [Hint: If you evaluate a double summation, it is easier to use the sum over X's values as the outer sum.]

4. Suppose that $X_1, \ldots, X_5$ are independent Poisson random variables, each of which has expected value 1.7. Find the probability that the sum of the X_j's is at least 6, i.e., find $P(X_1 + \cdots + X_5 \geq 6)$.