STAT/MA 41600
In-Class Problem Set #18: September 28, 2016

1. Suppose that the number of people who get food at the salad bar has a Poisson distribution with an average of 2 people per minute.
1a. Find the probability that at least 4 people get food at the salad bar during the next 3 minutes. (Hint: How many people *do we expect* get food at the salad bar during the next 3 minutes?)
1b. Find the probability that at least 3 people get food at the salad bar during the next 90 seconds. (Hint: How many people *do we expect* get food at the salad bar during the next 90 seconds?)
1c. What is the variance of the number of people who get food at the salad bar during the next 5 minutes?

2. The National Weather Service (NWS) states that, in a given year, a person has a probability of 1 in 1,042,000 of being struck by lightning.

Suppose that we survey 500,000 people (who are considered to be independent, with regard to lightning strikes). What is the probability that *at least one* of them is struck by lightning during that year?

3. Suppose that $X_1, \ldots, X_3$ are independent Poisson variables that each have an expected value of 0.8.
3a. Find $P(X_1 + X_2 + X_3 \leq 3)$.
3b. Let $Y = X_1 + X_2 + X_3$. For which value of y is $p_Y(y)$ the largest?

4. Suppose X is a Poisson random variable with $\lambda = 5$. Compute $\mathbb{E}((X)(X-1)(X-2))$.