STAT/MA 41600
In-Class Problem Set #17: September 24, 2018

1. At Purdue, approximately 53% of students are Indiana residents. Purdue has a large number of students, so if we start interviewing people randomly, it is perhaps safe to assume that their residencies are independent. Suppose that we interview people until we find the *third* Indiana resident.

1a. What is the expected number of interviews that we conduct?

1b. What is the variance of the number of interviews that we conduct?

1c. Find the probability that we conduct 6 or more interviews.

2a. If X is a Geometric random variable with parameter p, find $P(X > 8 \mid X > 3)$.

2b. If X is a Geometric random variable with parameter p, find $P(X \leq 8 \mid X > 3)$.

3. Suppose that X is a Geometric random variable with $\mathbb{E}(X) = 3$. Suppose that Y is a Binomial random variable with $n = 4$ and $p = 1/3$. Find $P(X > Y)$.

4. Review question: Consider a collection of 9 bears. There is a family of red bears consisting of one father bear, one mother bear, and one baby bear. There is a similar green bear family, and a similar blue bear family. We draw 5 consecutive times from this collection *without replacement* (i.e., not returning the bear after each draw). We keep track (in order) of the kind of bears that we get. Let X denote the number of red bears selected.

Find the variance of X.