STAT/MA 41600
In-Class Problem Set #17: September 25, 2017

1. Suppose that, in each round of a game, Alejandra rolls three dice simultaneously. She continues rolling all three dice, until the 10th round in which a triple appears (i.e., until the 10th round that all three dice have the same value), and then she stops afterward.
1a. What is the expected number of rounds?
1b. What is the variance of the number of rounds?
1c. What is the probability that she finishes her game in 13 rounds or less?

2. Starting on Sunday, Carlos randomly grabs a cookie as he exits the dining court at lunch. Assume that 40% of the cookies are chocolate, and that his picks are independent from day to day.

He is willing to continue selecting cookies at random (one per day) until he has eaten 5 of them, and then he stops afterwards. The dining court at his university is open seven days a week. What is the probability that he has *not yet eaten 5 chocolate cookies* by the end of the first week, i.e., by the end of the first 7 days?

3. Same setup as **2**. Let X be the number of days needed for him to eat 5 chocolate cookies.
3a. Find $P(X > 8 \mid X > 6)$.
3b. Find $P(X \leq 8 \mid X > 6)$.
3c. Find $P(X = 8 \mid X > 6)$.

4. Review question: Roll a 6-sided die. Whatever value appears, flip a fair coin that number of times. (For instance, if a "5" appears, then flip 5 fair coins.) Let X be the number of heads that appear on the coins. Find the probability mass function of X.