STAT/MA 41600
In-Class Problem Set #8: September 8, 2017

1. 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 bears from this collection without replacement. Let X denote the number of mother bears that are chosen.

Find the probability mass function of X.

2. Suppose that X has probability mass function $p_X(x) = (\frac{2}{7})(\frac{5}{7})^{x-1}$ for integers $x \geq 1$.
2a. Find $P(X > 4)$.
2b. If k is a nonnegative integer, find $P(X > k)$.
2c. Find $P(3 \leq X \leq 10)$. Hint: This is equivalent to $P(X > 2) - P(X > 10)$.
2d. If i and j are positive integers with $i \leq j$, find $P(i \leq X \leq j)$. Hint: This is equivalent to $P(X > i - 1) - P(X > j)$.

3. Roll three dice and add their values together. Let X denote the sum. Find $P(X \geq 7)$.

4. A family with three daughters and three sons needs to go to the grocery store. Besides the father, who is driving the car, exactly three of the children can come along to the grocery store with him. Suppose that the three children to join the father are chosen randomly, and all such choices are equally likely.

Let X denote the number of daughters who accompany the father to the grocery. Find the probability mass function of X.