MATH 362—Work Sheet 16

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NOT DUE B/C MIDTERM 2

Name: _____

1. Suppose an urn has 3 red balls and 1 green ball. Suppose I make draws with replacement until I get the green ball. Call this number of draws the random variable D.
   (a) What's the probability that $D = 1$?

   (b) What's the probability that $D = 3$?

   (c) What's the probability that $D > 3$?

   (d) What's the probability that $D > 7$ *given* the information that $D > 4$?

   (e) What's mean and standard deviation of D?

2. I like to compete in apple bobbing[1] competititons. Everytime I dunk my head underwater to get an apple, I have a probability of 1/5 of successfully retrieving the apple with my teeth. I win the competition after successfully retrieving 3 apples.

   (a) Name the probability distribution that governs the number of times I need to dunk my head to get 3 apples.

   (b) Compute the probability that I retrieve my third apple on the 7th attempt.

   (c) Compute the mean and standard deviation of the number of times I need to bob for apples to get 3 apples.

3. Suppose $S_2 = X_1 + X_2$ represents the sum of two rolls of a 6 sided die. Compute the mean and standard deviation of S_2.

[1] `https://en.wikipedia.org/wiki/Apple_bobbing`

4. *The Collector's Problem—This is a challenging problem that we will discuss in class.* When I was young, I loved the power rangers. My favorite cereal started including small action figures of the following five power rangers: The Red Ranger, The Pink Ranger, The Blue Ranger, the Yellow Ranger and the Black Ranger. Assuming there is a uniform distribution of the 5 rangers across cereal boxes. How many boxes of cereal should I expect to buy before collecting all five?

5. Suppose only 1% of the population is over 6 feet 3 inches tall. Out of a randomly selected group of 200 people, what's the probability that at least 4 of them are over 6'3".

6. How many raisins must cookies contain on average for the chance of the of a cookie containing at least one raisin to be at least 99%?