Statistics

Test 2

Form A

Spring 2016

Name: _____

Date: _____

<u>READ THESE INSTRUCTIONS CAREFULLY!</u>

- Circle or underline your final written answer.

- Justify your reasoning and show your work.

- If you run out of space, make a note and continue your work on the back of a page.

1. (10 pts.) You have an opportunity to play a dice game for $5. You will roll two 20-sided dice (of different colors); if the sum of the numbers on the dice is exactly 13, you win $40, and otherwise you get nothing.

    (a) Make a table to represent this game as a discrete random variable. What are the possible outcomes? What is the net value of each outcome? What is the probability of each outcome?

    (b) Compute the expected value of this game.

2. (10 pts.) Suppose we flip a coin 20 times in a row. In how many ways can the coin come up heads exactly nine times?

3. (10 pts.) In how many ways can the letters in the word BOOKKEEPER be rearranged?

4. (10 pts.) Suppose we roll two 20-sided dice and then draw four cards from a standard deck. How many possible outcomes does this experiment have?

5. (10 pts.) A particular aptitude test consists of 15 true-false questions. To get a passing score, you must correctly answer at least 12 questions.

   (a) If you decide to answer the questions at random (by flipping a coin, say) what is the probability that you will get a passing score?

   (b) Your friend claims to have answered the questions at random and correctly answered 13 of them. Do you believe them? Why or why not?

6. (10 pts.) The Greatball lottery winner is decided by drawing 5 white balls and 3 red balls from a drum. There are 51 white balls, labeled 1 through 51, and 15 red balls, labeled 1 through 15. To win the jackpot you must correctly guess the numbers on the five white balls (in any order) as well as the numbers on the red balls (in any order).

   (a) How many different Greatball draws are there?

   (b) What is the probability of winning the jackpot with a single lottery ticket?

7. (10 pts.) As of 2016 the U.S. House of Representatives includes 84 women and 351 men.

   (a) Suppose three congresspeople are selected at random. What is the probability that all three are women?
   (b) Suppose three congresspeople are selected to form a committee, consisting of a chair, vice chair, and ranking member. In how many ways can this committee be formed?

8. (10 pts.) Compute the mean and standard deviation of the following discrete random variable.

x	0	1	2	3	4
$P(x)$	2/15	1/3	1/15	1/5	4/15

9. (10 pts.) An District of Columbia license plate consists of two letters followed by four digits. How many different license plates can be issued using this scheme?