Probability and Statistics Exam One

Name: _____

Please show your work on all problems. Calculators are permitted. Problems 2 and 4 are worth 20 points, and all other problems are worth 10 points.

1. Suppose A and B are events such that $P(A) = 0.6$, $P(B) = 0.5$, and $P(A \cap B') = 0.3$. What is $P[(A \cup B)']$?

2. How many 9-letter passwords can be constructed from the 26 letters in the English alphabet if

   (a) letters may be repeated?

   (b) letters may not be repeated?

3. A boy mixes five cans of soda together. He has an abundant supply of sodas in the following flavors: Coke, Dr. Pepper, and Sprite. How many possible mixtures can be made?

4. A subcommittee of size six is selected at random from a club with ten male members and twelve female members.

    (a) Find the probability that exactly five of the people selected are female.

    (b) Find the probability that everyone selected is female, given that at least five of the members selected are female.

5. Let A_1, A_2, and A_3 be independent events with probabilities 0.6, 0.5, and 0.4, respectively. Find the probability that exactly two of these events occur.

6. You own a weighted coin which has a $\frac{3}{4}$ probability of landing heads up when flipped. This coin is placed into an urn with two fair coins. Then, a coin is selected randomly from the urn and flipped. If the result is heads, what is the probability that the coin selected was the weighted coin?

7. How many passwords can be formed by rearranging letters in the word "calculus"?

8. If $P(B) > 0$, show that $P(A \mid B) = 1 - P(A' \mid B)$.