STAT-243 Name: _____

Homework 5

For the following exercises, (a) identify the distribution, including the values of all parameters, and (b) find the probability.

Reminder (this should be in your sheet of notes for the quiz): the identification and parameters for part (a) should look like one of these:

Binomial(n = _____ , p = _____)
Poisson(μ = _____)
Geometric(p = _____)

1. A 2011 poll found that 35% of U.S. adults do not work at all while on summer vacation. In a random sample of 10 U.S. adults, find the probability that 2 or fewer do not work during summer vacation, assuming independence.

2. A website has an average of 6 hits per minute. In a 2 minute period, what is the probability that it gets exactly 11 hits?

3. The Federal Deposit Insurance Corporation (FDIC) normally insures deposits of up to $100,000 in banks that are members of the Federal Reserve System against losses due to bank failure or theft. Over the ten years from 2000 - 2010, the average number of bank failures per year was 45. Assuming that this yearly trend of an average of 45 failures per year continues, what is the probability that less than 60 banks will fail in the next year?

4. The probability that you will win a certain game is 0.3, independent of past wins and losses. If you play the game 20 times, what is the probability that you will win 3 or fewer times?

5. A 2010 American Community Survey estimates that 47.1% of women ages 15 and over are married. We randomly select five women between these ages. What is the probability that the fifth woman selected is the only one that is married?

6. Many primary care doctors feel overworked and burdened by potential lawsuits. In fact, the Physicians' Foundation reported that 60% of general practice physicians in the United States do not recommend medicine as a career (Reuters, Nov 18, 2008). In a random sample of 5 general practice physicians, find the probability that <u>at least one</u> does not recommend medicine as a career, assuming independence.

7. A husband and wife both have brown eyes but carry genes that make it possible for their children to have brown eyes (probability 0.75), blue eyes (probability 0.125), or green eyes (probability 0.125). What is the probability that their third child is the first one with green eyes?

8. An industrial fabric production machine makes an average of 0.7 defects per square yard. What is the probability of finding exactly 6 defects in the next 5 square yards of fabric?

9. California highway patrol reports show that an estimated 7.8% of drivers exceed the speed limit of 70 mph on I-5. Suppose a highway patrol officer is hidden on the side of the freeway. What is the probability that the first speeder she observes is within the first 5 cars that pass her?