Test 8A   A P Statistics   Name: _____

Directions: *Work on these sheets. A random digit table is attached.*

Part 1: Multiple Choice. *Circle the letter corresponding to the best answer.*

1. In a large population of college students, 20% of the students have experienced feelings of math anxiety. If you take a random sample of 10 students from this population, the probability that exactly 2 students have experienced math anxiety is
   (a) 0.3020
   (b) 0.2634
   (c) 0.2013
   (d) 0.5
   (e) 1
   (f) None of the above

2. Refer to the previous problem. The standard deviation of the number of students in the sample who have experienced math anxiety is
   (a) 0.0160
   (b) 1.265
   (c) 0.2530
   (d) 1
   (e) .2070

3. In a certain large population, 40% of households have a total annual income of $70,000. A simple random sample of 4 of these households is selected. What is the probability that 2 or more of the households in the survey have an annual income of over $70,000?
   (a) 0.3456
   (b) 0.4000
   (c) 0.5000
   (d) 0.5248
   (e) The answer cannot be computed from the information given.

4. A factory makes silicon chips for use in computers. It is known that about 90% of the chips meet specifications. Every hour a sample of 18 chips is selected at random for testing. Assume a binomial distribution is valid. Suppose we collect a large number of these samples of 18 chips and determine the number meeting specifications in each sample. What is the approximate mean of the number of chips meeting specifications?
   (a) 16.20
   (b) 1.62
   (c) 4.02
   (d) 16.00
   (e) The answer cannot be computed from the information given.

5. Which of the following are true statements?
   I. The expected value of a geometric random variable is determined by the formula $(1 - p)^{n-1}p$.
   II. If X is a geometric random variable and the probability of success is .85, then the probability distribution of X will be skewed left, since 85 is closer to 1 than to 0.
   III. An important difference between binomial and geometric random variables is that there is a fixed number of trials in a binomial setting, and the number of trials varies in a geometric setting.
   (a) I only
   (b) II only
   (c) III only
   (d) I, II, and III
   (e) None of the above gives the complete set of true responses.

Part 2: Free Response
Answer completely, but be concise. Write sequentially and show all steps.

According to government data, 20% of employed women have never been married.

6. What is the random variable X of interest here? Define X. Is X normal, binomial, or geometric?

7. If 10 employed women are selected at random, what is the probability that 2 or fewer have never been married?

8. What are the mean and standard deviation of X?

9. Find the probability that the number of employed women who have never been married is within 1 standard deviation of its mean.

10. Describe the four conditions that describe a binomial setting.

A quarterback completes 44% of his passes.

11. Explain how you could use a table of random numbers to simulate this quarterback attempting 20 passes.

12. Explain how you could use a TI-83 to simulate this quarterback attempting 20 passes.

13. Using your scheme from either (11) or (12), simulate 20 passes. If you use the random digit table, begin on line **149**. If you use the TI-83, first enter $149 \rightarrow$ rand to seed your random number generator, and indicate which one you use. List the numbers generated and circle the "successes." Calculate the percent of passes completed.

14. What is the probability that the quarterback throws 3 incomplete passes before he has a completion?

15. How many passes can the quarterback expect to throw before he completes a pass?

16. Use *two* methods to determine the probability that it takes more than 5 attempts before he completes a pass.

17. Construct a probability distribution table (out to n = 6) for the number of passes attempted before the quarterback has a completion.

18. Sketch a probability histogram (out to n = 6) for the table you constructed in the previous problem.

I pledge that I have neither given nor received aid on this test. _____