**BA 302: Assignment 2: Chapters: 5, 6, and 7: Total 75 points**

**Due by Midnight (11:59 pm), Sunday, October 12th, 2014: Dropbox 2**

**TRUE/FALSE (1 POINT EACH)**

**Chapter 5**   
1. Mutually exclusive events cannot be independent. T

2. The probability of an event is always greater than zero and less than 1.T

3. If events A and B are independent, then the probability of A given B, that is, P(A|B) is equal to 0. F  
  
4. Events that have no sample space outcomes in common and, therefore cannot occur simultaneously are referred to as independent events. F

5. Events that have no sample space outcomes in common and, therefore cannot occur simultaneously are referred to as independent events True  
**Chapter 6**  
6. In a binomial distribution the random variable X is continuous.  T  
  
7. The variance of the binomial distribution is √np(1-p). T

8. The binomial experiment consists of n independent, identical trials, each of which results in either success or failure and the probability of success on any trial must be the same. T

**Chapter 7**  
9. The mean and variance are the same for a standard normal distribution.  
  
10. In a statistical study, the random variable X = 1, if the house is colonial and X = 0 if the house is not colonial, then it can be stated that the random variable is discrete.   
  
11.  For a discrete random variable which can take values from 0 to 150, P(X ≤ 100) is greater than P(X<100).

12. The number of defective pencils in a lot of 1000 is an example of a continuous random variable.

13. All continuous random variables are normally distributed. F

**Multiple Choice Questions (2 points each)**  
  
**Chapter 5**  
1. Two mutually exclusive events having positive probabilities are \_\_\_\_\_\_\_\_\_\_\_\_\_\_ dependent.   
A. Always  
B. Sometimes  
C. Never

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an event which is .mutually exclusive and collectively exhaustive.  
A. Random experiment  
B. Sample Space  
C. Probability  
D. A complement  
E. A population

3. In which of the following are the two events A and B, always independent?   
A. A and B are mutually exclusive  
B. The probability of event A is not influenced by the probability of event B  
C. The intersection of A and B is zero  
D. Events A and B have no common element  
E. B and D

4. If two events are mutually exclusive, we can \_\_\_\_\_ their probabilities to determine the union probability.   
A. Divide  
B. Add  
C. Multiply  
D. Subtract

5. Events that have no sample space outcomes in common and therefore, cannot occur simultaneously are:   
A. Independent  
B. Mutually Exclusive  
C. Intersections  
D. Unions  
  
**Chapter 6**  
6. If p =.1 and n =10, then the corresponding binomial distribution is   
A. Right skewed  
B. Left skewed  
C. Symmetric  
D. Bimodal  
  
 7. If p=.55 and n=10, then the corresponding binomial distribution is   
A. Right skewed  
B. Left skewed  
C. Symmetric  
D. Bimodal  
  
8. The variance of the binomial distribution is equal to:   
A. P  
B. Np  
C. *Px(1-p)n-x*  
D.  (n)(p)(1-p)  
E.   
  
9. Which of the following is a not a valid probability value for a discrete random variable?   
A. .5  
B. 1.0  
C. -.7  
D.  0

10. Which of the following statements about the binomial distribution is not correct?   
A. Each trial results in a success or failure  
B. Trials are independent of each other   
C. The probability of success remains constant from trial to trial  
D.  The random variable of interest is discrete  
E.  All of the above are correct

11. Which one of the following statements is not an assumption of the binomial distribution?   
A. Sampling is with replacement  
B. The experiment consists of n identical trials  
C. The probability of success remains constant from trial to trial  
D. Trials are independent of each other  
E. Each trial results in one of two mutually exclusive outcomes  
  
12. A coin is tossed 12 times. What is the probability that more than four heads will occur  
A. .1938  
B. .8062  
C. .1208  
D. .1934

13. In a study conducted for the State Department of Education, 30% of the teachers who left teaching did so because they were laid off. Assume that we randomly select 10 teachers who have recently left their profession. Find the probability that less than 4 of them were laid off.   
A. .8497  
B. .6496  
C. .2001  
D. .2668

**Chapter 7**14. The area under the normal curve between z=0 and z=1 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the area under the normal curve between z=1 and z=2.   
A. Less than  
B. Greater than  
C. Equal to  
D. A, B or C above depending on the value of the mean  
E. A, B or C above dependent on the value of the standard deviation

15.  The fill weight of a certain brand of adult cereal is normally distributed with a mean of 910 grams and a standard deviation of 5 grams. If we select one box of cereal at random from this population, what is the probability that it will weigh less than 904 grams?   
A. .8849  
B. .3849  
C. .1151  
D. .7698  
E. .2302

16.  The normal approximation of the binomial distribution without continuity correction is appropriate when:   
A. np ≥ 10  
B. n(1–p) ≥ 10  
C. np ≤ 10  
D. np(1-p) ≥ 10  
E. np≥ 10 and n(1–p)≥ 10

**Essay Questions (5 points each)  
Chapter 5**  
  
1. At a college, 70 percent of the students are female and 40 percent of the students receive a grade of C. About 45 percent of the students are female and not C students. Use this contingency table.

|  |  |  |  |
| --- | --- | --- | --- |
| Gender\Grade | C | Not C --- |  |
| Female (F) | .25 | 0.45 | 0.70 |
| Male (M) | .15 | .23 | .38 |
|  | 0.40 | .68 | 1.08 |

If a randomly selected student is a C student, what is the probability the student is male? 0.28

2.  A and B are independent events. Moreover, P(A) = 0.5 and P(B) = 0.6. Determine P(A  B), that is, P(A or B)  
   
**Chapter 6**  
  
3. The J.O. Supplies Company buys calculators from a Korean supplier. The probability of a defective calculator is 10%. If 14 calculators are selected at random, what is the probability that 4 or less of the calculators will be defective?

4. An important part of the customer service responsibilities of a cable company relates to the speed with which trouble in service can be repaired. Historically, the data show that the probability is 0.60 that troubles in a residential service can be repaired on the same day. For the first seven troubles reported on a given day, what is the probability that 4 or more troubles will be repaired on the same day?

**Chapter 7**  
5. Given the length an athlete throws a hammer is a normal random variable with mean 50 feet and standard deviation 5 feet, what is the probability he throws it:   
Between 48 feet and 53 feet?

6.  If x is a binomial random variable where n=100 and p=.5, find the probability that x is more than or equal to 45 using the normal approximation to the binomial.