Prince Sultan University
STAT 101
Major III Examination
Fall Semester 2008, Term 082
Tuesday, June 9, 2009
Dr. Quazi Abdus Samad

Time Allowed**: 90 minutes**

Name: _____ _____ _____
(First) (Middle) (Last)

ID Number: _____

Section No.: _____

Important Instructions*:*

You may use CASIO scientific calculator that does not have programming or graphing capabilities.
You may **NOT borrow** a calculator from anyone.
There should be **NO talking** during the examination.
Your exam will be taken **immediately** without any warning if your mobile is seen or heard
You must show all your work beside the problem. Be organized.
You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
This examination has **11** problems with several parts in each case. Make sure that your paper has all these problems.

Problems	Max points	Student's Points
1,2,3	19	
4	06	
5,6	10	
7,8,9	13	
10,11	12	
Total	**60**	

Question 1 (4.5 points) Let x be a binomial random variable with n =10, p =.4. Find these values **using the appropriate binomial formula**:

a. $P(x = 4)$

b. $P(x \leq 2)$

c. $P(x \geq 2)$

Question 2 (4.5 points) Use the Cumulate binomial probability Table 1 in Appendix I to find the following:

a. $P(x<11)$ for n = 15, p = .4

b. $P(x \geq 6)$ for n = 15, p =.7

c. $P(2<x<6)$ for n = 10, p = .6

Question 3 (10 points) Let x be a binomial random variable with n = 20 and p =.2.

a. Calculate $P(x \leq 4)$ using the binomial formula.

b. Calculate $P(x \leq 4)$ using Cumulative binomial Table 1 in Appendix I.

c. Compare results in part **a** and **b**. Do they match?

d. Calculate the mean and standard deviation of the random variable x.

e. Use the results of part **d** to calculate the intervals $\mu \pm \sigma$, $\mu \pm 2\sigma$, $\mu \pm 3\sigma$. Find the probability that an observation will fall into each of these intervals.

f. Are the results in part **e** consistent with the Tchebysheff's Theorem? **Why or why not**?

Question 4 (6 points) Consider a binomial random variable with $n = 9$ and $p = .3$. Fill in the blanks in the table below.

The problem	List the values of x	Write the probability	Rewrite the probability, if needed	Find the probability
Exactly two				
Two or more				
Two or less				
Between 3 and 5 (inclusive)				

Question 5 (4 points) Let x be a Poisson random variable with mean $\mu = 3.5$. Use the Cumulative Poisson probability Table 2 in Appendix I to calculate these probabilities:

a. $P(x \geq 6)$

b. $P(x < 7)$

c. $P(x = 3)$

d. $P(2 \leq x \leq 5)$

Question 6 (6 points) Let x be a Poisson variable with mean $\mu = 4.5$. Calculate these probabilities using the Poisson formula:

a. $P(x = 0)$

b. $P(x > 3)$

c. $P(x = 6)$

Question 7 (3 points) Let x be a binomial random variable with n = 15 and p =.2.

a. Calculate $P(x \leq 3)$ using the Cumulative binomial probability Table 1 in Appendix I to obtain the exact binomial probability.

b. Use the Poisson approximation to calculate $P(x \leq 3)$.

c. Compare the results of parts **a** and **b**. Is the approximation accurate?

Question 8 (6 points) A professor has received a grant to travel to an archaeological dig site. The grant includes funding for five graduate students. If there are five male and four female graduate students eligible and equally qualified, what is the probability that the professor will select three male and two female graduate students to accompany her to the dig site?

Question 9 (4 points) Find these probabilities for the standard normal random variable z:

a. $P(z < 1.98)$

b. $P(z > - 1.39)$

c. $P(-1.46<z<0)$

Question 10 (6 points) a. Find a z_0 such that $P(z > z_0) = 0.0505$

b. Find a z_0 such that $P(-z_0<z<z_0) = 0.80$

d. Find a z_0 such that $P(z < z_0) = .0643$

Question 11 (6 points) Suppose a normal random variable x has mean $\mu = 1.3$ and standard deviation $\sigma = .25$. Find the probabilities of these x-values.

a. $.90<x<1.35$

b. $x > 1.45$

c. $1.25 < x < 1.60$

Best of luck!