Prince Sultan University
STAT 101
Major III Examination
Fall Semester 2008, Term 081
Tuesday, January 20, 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 **10** problems with several parts in each case. Make sure that your paper has all these problems.

Problems	Max points	Student's Points
1	12	
2,3,4	18	
5,6,7	13	
8,9,10	17	
Total	**60**	

Question 1. (12 points) Let z denote a standard normal random variable.

a. Find $P(z > 2.78)$

b. Find $P(-0.98 < z < 1.32)$

c. Determine the value ofz_0 which satisfies $P(z \geq z_0) = 0.6900$

d. Find $P(z < -1.57)$

e. Find z_0 such that $P(-z_0 < z < z_0) = 0.805$

f. Find z_0 such that $P(z < z_0) = 0.0765$

g. Find z_0 such that $P(z > z_0) = 0.5$

h. Find P(x = a) where **a** is any number

Question 2 (3 points) A normal random variable x has an unknown mean μ and standard deviation $\sigma = 2$. If the probability that x exceeds 9.5 is .80, find μ.

Question 3 (6 points) Consider a standard random variable with $\mu = 0$ and standard deviation $\sigma = 1$. Use Table 3 and fill in the probabilities below:

The interval	**Write the probability**	**Rewrite the probability (if needed)**	**Find the probability**
Greater than 5			
Less than or equal to -5.8			
Between -0.5 and 2.5			

Question 4 (9 points) Let x be a binomial random variable with n = 20 and p =.6.

a. Is the normal approximation to binomial appropriate? **Show why or why not**?

b. Find $P(x<6)$ using the normal approximation and compare this with the exact binomial probability in Appendix Table 1

c. Find $P(x\geq 9)$ using the normal approximation and compare this with the exact binomial probability in Appendix Table 1

Question 5 (3 points) Find the normal approximation to $P(355 \leq x \leq 360)$ for a binomial probability distribution with $n = 400$ and $p = .9$

Question 6 (4 points) Suppose the random variable x has a binomial distribution corresponding to $n = 25$ and $p = .30$. Use the normal approximation to calculate $P(x = 5)$. Compare this result with the exact probability in Appendix Table 1.

Question 7 (6 points) Let x be a Poisson random variable with mean $\mu = 3.5$. Use Appendix Table 2 to calculate the following probabilities:

a. $P(x \geq 5)$

b. $P(x = 3)$

c. $P(2 \leq x \leq 4)$

Question 8 (4 points) Let x be a binomial random variable with n =20 and p = .1. Use the Poisson approximation to calculate P(x ≤2).

Question 9 (4 points) A student has decided to rent three movies for a three-day weekend. If there are 4 action movies and 6 romance movies that are of equal interest to the student, what is the probability that the student will select 1 romance movie and 2 action movies?

Question 10 (9 points) Let x be a hyper geometric random variable with N = 12, n =3, and M = 4.

a. Calculate P(0)

b. Calculate P(1)

c. Calculate P(3)