Prince Sultan University
STAT 101
Final Examination
Second Semester 2011/2012, Term 112
Thursday, 24th May 2012
Dr. Bahha Eldin Abdalla

Time Allowed: 120 minutes

Maximum points: 80 points

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

ID Number: _____ **Section:**_____

Important Instructions*:*

1. You may use CASIO scientific calculator that does not have programming or graphing capabilities.
2. You may NOT borrow a calculator from anyone.
3. You do NOT get special consideration if you forget your calculator.
4. Don't use notes or any notebook.
5. There should be NO talking during the examination.
6. Your exam will be taken immediately without any warning if your mobile is seen or heard.
7. You must show all your work beside the problem. Be organized.
8. You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
9. This examination has **14** problems, some with several parts. Make sure that your paper has all these problems

Problem	Max points	Student's Points
1,2,3	17	
4,5	12	
6,7	14	
8,9,10,11	19	
12,13,14	18	
Total	**80**	

Q1 (8 points) A group of 750 people were classified according to their gender and smoking habits. The results are given in the following table:

Gender	Smoker	Non-smoker
Male	210	315
Female	90	135

One person is selected at random from this group

a. Find the probability that the selected person is a male or a smoker.

b. Given that the selected person was a female. Find the probability that he is a smoker

c. Are the events non-smoker and female independent? Why?

Q2 (6 points) Given $P(B \text{ or } A) = 1$, $P(\overline{B \text{ and } A}) = 0.7$, and $P(\overline{B}\ ) = 0.4$, find:

(a) $P(A)$

(b) $P(\overline{A}|B)$

Q3 (3 points) The average number of newspapers for sale in a airport newsstand is 12, and the standard deviation is 4. The average age of the pilots is 37 years, with standard deviation of 6 years. Which data set is more variable?

Q4 (9 points) A survey of 36 selected recording companies showed these numbers of days that it took to receive a shipment from the day it was ordered.

Days	Frequency
1 – 3	6
4 – 6	8
7 – 9	10
10 – 12	7
13 – 15	0
16 – 18	5

Find each of these.

1. Mean

2. Modal class

3. Variance

4. Standard deviation

Q5 (3 points) One single-digit number is to be selected randomly.
(a) List the sample space.

(b) What is the probability of each single digit?

(c) What is the probability of an even number?

Q6 (8 points) The mean lifetime of a certain tire is 30,000 miles and the standard deviation is 2,500 miles.
(a) If we assume the mileages are normally distributed, what percentage of all such tires will last between 24,000 and 37,000 miles?

(b) If we assume nothing about the shape of the distribution, at least what percentage of all such tires will last between 21,250 and 38,750 miles?

Q7 (6 points) Find *k* then find the mean and the standard deviation for the following probability distribution: $P(x) = \frac{x^2 + k}{50}$ for $x = 1, 2, 3, 4$

Q8 (6 points) Let x be a binomial random variable with $n = 100$ and $p = 0.3$.

(a) Can we use the Poisson approximation to find $P(30 \le x < 35)$? Why?

(b) Use the normal approximation to find $P(30 \le x < 50)$

Q9 (4 points) If x is a binomial random variable with n = 4 and $P(0) = 0.0081$, find $P(3)$.

Q10 (5 points) Of the parts produced by a particular machine, 0.5% are defective. If a random sample of 10 parts produced by this machine contains 2 or more defective parts, the machine is shut down for repairs. Find the probability that the machine will be shut down for repairs based on this sampling plan.

Q11 (4 points) The number of boating accidents on Lake Emilie follows a Poisson distribution. The probability of an accident is 0.003. If there are 1,000 boats on the lake during a summer month, find the probability that there will be 6 accidents.

Q12 (5 points) The average salary for graduates entering the actuarial field is $40,000. If the salaries are normally distributed with a standard deviation of $5,000, find the probability that a group of nine graduates will have a group average over $45,000.

Q13 (8 points) Given that x is a normally distributed random variable with a mean of 60 and a variance of 100,

1. Find $P(38 \le x \le 78)$

2. Find the x values that bound the middle 42% of the normal distribution.

Q14 (5 points) In a normal distribution, find the mean when the standard deviation is 4 and 3.75% of the area lies to the right of 60.

Good-Luck