Prince Sultan University
STAT 101
Final Examination
First Semester 2010/2011, Term 101
Tuesday, 1st February 2011
Dr. Bahha Eldin Abdalla & Dr. Mohammed Al-Haj Ebrahem

Time Allowed: 120 minutes

Maximum points: 40 points

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

ID Number: _____ **Serial 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 **10** problems, some with several parts. Make sure that your paper has all these problems

Problem	Max points	Student's Points
1	5	
2	4	
3	3	
4	3	
5	6	
6	11	
7	2	
8	2	
9	2	
10	2	
Total	**40**	

Q1 (5 points total)

- Let Z denotes a standard normal random variable.

1. **(1 Point)** Find the area to the right of $Z = -1.99$.

2. **(2 Points)** Find $P(-2.37 < Z < 1.73)$.

3. **(2 Points)** Find Z_0 such that $P(-1.31 < Z < Z_0) = 0.8837$.

Q2 (4 points total)

Teacher's salary in North Dakota has a normal distribution with mean \$35441 and standard deviation \$5100.

1. **(2 Points)** What is the probability that a randomly selected teacher's salary is at least \$45000?

2. **(2 Points)** For a random sample of 75 teachers, what is the probability that the sample mean is at most \$37000?

Q3 (3 points)

A random sample of size 25 is selected from a normal distribution with mean -2 and variance 100. Find A such that $P(\overline{X} \geq A) = 0.3300$, where $\overline{X}$ denotes the sample mean.

Q4 (3 points)

Of the total population of the United States, 20% live in the northeast. If 200 residents of the United States are selected at random, use the normal approximation to find the probability that at least 50 lives in northeast.

Q5 (6 points total)

- Let A and B two events such that $P(A) = 0.3$, $P(\overline{B}) = 0.2$ and $P(A|B) = 0.25$.

  1. **(2 Points)** Calculate $P(A \text{ or } B)$.

  2. **(2 Points)** Are A and B independent events? Why?

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- **(2 Points)** Four girls and six boys are to be divided into two teams say, team C and team D. In how many ways this can be done such that each team consists of two girls and three boys.

Q6 (11 points total)

Given the following data set: 5, 25, 12, 50, 16, 32

1. ***(2 points)*** Calculate the interquartile range.

2. ***(2 points)*** Find the five-number summary.

3. ***(1 point)*** Construct a boxplot for the data.

4. ***(1 point)*** Use the boxplot, describe the shape of the distribution of the data.

5. ***(2 points)*** Check the above data set for outliers.

6. ***(1 point)*** Calculate the percentile rank for the value 16.

7. ***(2 points)*** Calculate the coefficient of variation if the sample variance of the above data set equal 261.467.

Q7 (2 points)

Let X be a random variable with the following probability distribution:

x	0	1	2	3	4	5
P(x)	0.05	A	0.30	0.20	B	0.05

The mean μ of the random variable X is equal 2.15. Find A and B.

Q8 (2 points)

The number of cars entering a parking lot is a random variable that has a Poisson distribution with a mean of 2 cars per hour. The working hours are from 8 a.m to 5 p.m daily (9 hours). Find the probability that exactly 12 cars will arrive to the parking lot in a randomly chosen working day.

Q9 (2 points)

A sample of 25 values has standard deviation equal 6. Calculate $\sum_{i=1}^{25}(X_i - \overline{X})^2$.

Q10 (2 points)

The mean of a distribution is 75 and the variance is 100. Use Chebyshev's theorem to find the interval in which at least $\frac{5}{9}$ of the values will lie.

Good-Luck