Prince Sultan University
STAT 101
Final Examination
Second Semester 2010/2011, Term 102
Sunday, 5th June 2011
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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 **9** problems, some with several parts. Make sure that your paper has all these problems

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

Q1 (9 points total)
Circle the right answer in each of the following:

1. Given the following data set 5, 8, 4, 3, 3, 8, –10**.** Calculate the median.

a. 3 **b.** 4 **c.** 3.5 **d.** None of the choices

2. Given the following data set 9, 4, 5, 3, –1**.** Calculate the variance.

a. 3.6 **b.** 4 **c.** 13 **d.** None of the choices

3. If A and B are two disjoint events then $A \cap B$ is

a. 0 **b.** ϕ **c.** $P(A)P(B)$ **d.** None of the choices

4. Let X has a binomial distribution. If the mean of X is equal 5 and the variance of X is equal 2.5, then $E(X^2)$ is equal

a. 25 **b.** 7.5 **c.** 27.5 **d.** None of the choices

5. Let A and B be two events such that P(A) = 0.5 ,
$P(A \cap B) = 0.1$ and $P(A \cup B) = 0.7$, then $P(\overline{B})$ is equal

a. 0.3 **b.** 0.1 **c.** 0.7 **d.** None of the choices

6. A box contains three black balls and two white balls. Three balls are drawn at random one at a time and without replacement. The probability that we get exactly two black balls is

a. 0.2 **b.** 0.144 **c.** 0.6 **d.** None of the choices

7. If a sample of n observations has standard deviation equal 6, and
$\sum_{i=1}^{n}(X_i - \overline{X})^2 = 864$ then the sample size (n) is equal

a. 23 **b.** 25 **c.** 145 **d.** None of the choices

8. A random variable **X** has the following probability distribution

x	-2	-1	0	1	2
p(x)	0.15	0.2	0.3	0.2	0.15

Calculate $P(-1 < X < 1)$.

a. 0.7 **b.** 0.5 **c.** 0.3 **d.** None of the

9. In a boxplot If the value of the difference between the median and Q_1 is greater than the value of the difference between Q_3 and the median then the shape of the distribution is:

a. Skewed to the left. **b.** Skewed to the right. **c.** Symmetric **d.** None of the choices

Q2 (4 points total) Let Z denotes a standard normal random variable.

1. **(2 Points)** Find $P(-1.28 < Z < 2.12)$.

2. **(2 Points)** Find the 67^{th} percentile of Z.

Q3 (6 points total)

The time it takes a group of adults to complete a certain achievement test has a normal distribution with mean 46.2 minutes and standard deviation 8 minutes.

1. **(3 Points)** find the probability that a randomly selected adult will complete the test in less than 43 minutes.

2. **(3 Points)** For a sample of 49 adults, find the probability that the sample mean is greater than 45 minutes

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Q4 (3 points)

A random variable X has normal distribution with mean μ and standard deviation 100. If $P(X \leq 2) = 0.975$ then find μ.

Q5 (5 points)

A random variable X has a normal distribution with mean 85 and variance 81.

Find A and B such that $P(A \leq X \leq B) = 0.5089$ and $P(X \geq B) = 0.33$

Q6 (3 points)

According to recent surveys, 60% of households have personal computers. If a random sample of 180 households is selected, use the normal approximation to find the probability that fewer than 100 have personal computer.

Q7 (4 points total)

Let A and B two events such that $P(\overline{A}) = 0.8$, $P(B) = 0.6$ and $P(A \cup B) = 0.7$.

1. **(2 Points)** Calculate $P(B|A)$.

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

Q8 (3 points)

Telephone calls entering a college switchboard, follow a Poisson distribution on the average of two calls every three minutes. Find the probability of five calls arriving in a nine minute period.

Q9 (3 points)

A set of data has a bell shaped distribution with mean 50 and standard deviation 4. Find the percentage of the values that will fall between 42 and 58.

Good-Luck