Prince Sultan University
STAT 271
First Examination
Second Semester 2010/2011, Term 102
Wednesday, 6th April 2011
Dr. Mohammed Al-Haj Ebrahem

Time Allowed: 90 minutes
Maximum points: 20 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 **8** problems, some with several parts. Make sure that your paper has all these problems

Problem	Max points	Student's Points
1	4	
2	2	
3	2	
4	4	
5	2	
6	2	
7	2	
8	2	
Total	*20*	

Q1 (4 points) Complete the following:

1. For testing, $H_0 : \sigma^2 = 15$ vs. $H_1 : \sigma^2 \neq 15$, the critical values of χ^2 **test** with $\alpha = 0.1$ and 20 df are………………………………………………………………….

2. For testing $H_0 : \mu = 50$ vs. $H_1 : \mu < 50$, the critical value of **Z test** with $\alpha = 0.33$ is………………………………………………………………………………

3. The P-value of a right tailed **Z test** with the value of test statistic 2.09 is………………………………………………………………………….

4. The approximate P-value of a two tailed **t test** with the value of test statistic -2.4 and 10 d.f is……………………………………………………………………….
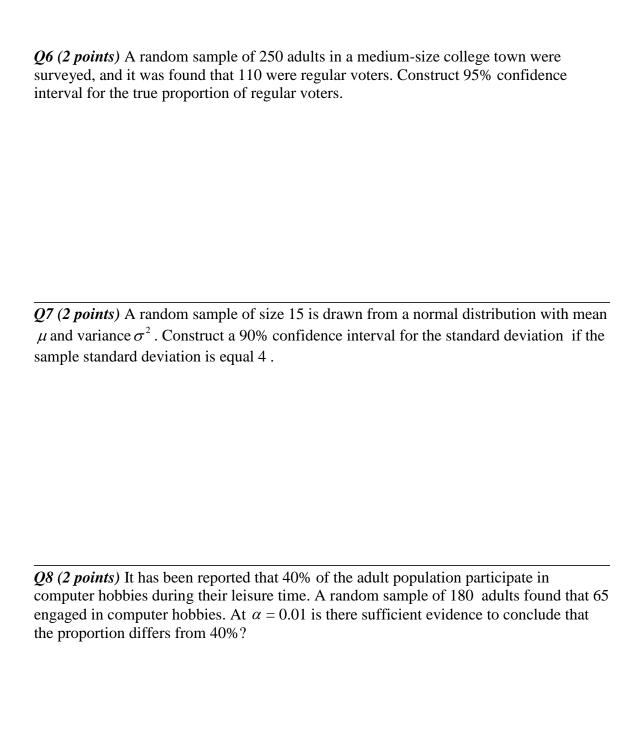

Q2 (2 points) A random sample of size $n = 16$ is taken from a normal distribution with mean μ and variance σ^2. The sample variance is equal 9. Calculate the width of a 90% confidence interval for μ.

Q3 (2 points) A researcher wishes to estimate within $300 the true average amount of money a county spends on road repairs each year. The standard deviation of the population is $900. If he wants to be 95% confident, how large a sample size is necessary?

Q4 (4 points total) A random sample of size 16 is drawn from a normal distribution with mean μ and variance σ^2. The sample mean is equal 10 and the sample variance is equal 25.

1. **(1 point)** For testing, $H_0 : \mu = 12$ vs $H_1 : \mu < 12$, calculate the value of test statistic.

2. **(1 point)** Calculate the approximate P-value.

3. **(1 point)** At $\alpha = 0.1$, what is your conclusion.

4. **(1 point)** Construct a 90% confidence interval for μ.

Q5 (2 points) A researcher claims that the standard deviation of the number death annually from tornadoes in the United States is less than 25. If a sample of 10 randomly selected years had a standard deviation of 21, is the claim believable? use $\alpha = 0.05$.

Q6 (2 points) A random sample of 250 adults in a medium-size college town were surveyed, and it was found that 110 were regular voters. Construct 95% confidence interval for the true proportion of regular voters.

Q7 (2 points) A random sample of size 15 is drawn from a normal distribution with mean μ and variance σ^2. Construct a 90% confidence interval for the standard deviation if the sample standard deviation is equal 4 .

Q8 (2 points) It has been reported that 40% of the adult population participate in computer hobbies during their leisure time. A random sample of 180 adults found that 65 engaged in computer hobbies. At $\alpha = 0.01$ is there sufficient evidence to conclude that the proportion differs from 40%?

Good Luck