Prince Sultan University
Mathematics Department

STAT 271

First Major Exam

Term 171

Sunday 22, 2017

Time Allowed: **90** minutes

Student Name: _____

Student ID #: _____

Time:

Teacher's Name: Dr. Eric Benson

Important Instructions:

1. You may use a scientific calculator that does not have programming or graphing capabilities.
2. You may NOT borrow a calculator from anyone.
3. You may NOT use notes or any textbook.
4. There should be NO talking during the examination.
5. Your exam will be taken immediately if your mobile phone is seen or heard
6. Looking around or making an attempt to cheat will result in your exam being cancelled
7. This examination has 15 problems, some with several parts. Make sure your paper has all these problems.

Problems	Max points	Student's Points
1	20	
2	10	
3	15	
4	20	
5	15	
Total	**80**	**/80 = %**

20 points

1. Industrial wastes and sewage dumped into our rivers and streams absorb oxygen and thereby reduce the amount of dissolved oxygen available for fish and other forms of aquatic life. One state agency requires a minimum of 5 parts per million (ppm) of dissolved oxygen in order for the oxygen content to be sufficient to support aquatic life. Six water specimens taken from a river at a specific location during the low-water season (July) gave readings of 4.9, 5.1, 4.9, 5.0, 5.0, and 4.7 ppm of dissolved oxygen. Do the data provide sufficient evidence to indicate that the dissolved oxygen content is less than 5 ppm? Test using $\alpha = 0.05$.

10 points

2. A random sample of 100 observations from a quantitative population produced a sample mean of 26.8 and a population standard deviation of 6.5. Use the p-value approach to determine whether the population mean is different from 28. Explain your conclusions.

15 points

3. Assume that the sports page of your local newspaper reported that 65% of males over the age of 17 in the United States would skip an important event such as a birthday party or an anniversary dinner to watch their favorite professional sports team play. A random sample of 676 adult males over the age of 17 in the Dallas-Fort Worth market reveals that 507 would be willing to skip an important event to watch their favorite team play. Given the results of the survey, can you conclude that the proportion of adult males who would skip an important event to watch their favorite team play is greater in the Dallas-Fort Worth area than in the nation as a whole? Conduct your test at the $\alpha = 0.05$ level of significance.

20 points

4. According to CNN, the average starting salary for accounting graduates was $47,413. Suppose that the American Society for Certified Public Accountants planned to test this claim by randomly sampling 200 accountants who recently graduated.

   a. State the appropriate null and alternative hypotheses. **(5 points)**

   b. Compute the power of the hypothesis test to reject the null hypothesis if the true average starting salary is only $47,000. Assume that the population standard deviation is known to be $4,600 and the test is to be conducted using an alpha level equal to 0.05. **(15 points)**

15 points

5. A life insurance salesman believes that the mean age of people who buy their first life insurance plan is less than 35. To test his belief he takes a random sample of 15 customers who have just purchased their first life insurance. Their ages are shown, and assume to be normally distributed: 42, 43, 28, 34, 30, 36, 25, 29, 32, 33, 27, 30, 22, 37, and 40. **Traditional Method Only**

   a. Can we conclude at the 1% significance level that the insurance salesman is correct? **(10 points)**

   b. Estimate the *p-value* for this test. **(5 points)**