Prince Sultan University
Mathematics Department

STAT 271

Second Major Exam

Semester II, Term 142

Sunday 3, 2015

Time Allowed:**1: 30** minutes

Student Name: _____

Student ID #: _____ Section #:

Time:

Teacher Dr. 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	15	
2	15	
3	15	
4	15	
5	20	
Total	**80**	**/80 = %**

15 points

1. To compare two programs for training industrial workers to perform a skilled job, 20 workers are included in an experiment. Of these, 10 are selected at random and trained by method 1; the remaining workers are trained by method 2. After completion of training, all the workers are subjected to a time-and-motion test that records the speed of performance of a skilled job. Test if the mean of method 2 exceeds that of method 1 by three. **P-value Method and Tradition Method**

Method 1	15	20	11	23	16	21	18	16	27	25
Method 2	23	31	13	19	23	17	28	27	25	28

15 points

2. A physical education director claims by taking a special vitamin, a weight lifter can increased his strength. Eight athletes are selected and given a test of strength, using the standard bench press. After 2 weeks or regular training, supplemented with the vitamin, they are tested again. Test the effectiveness of the vitamin regimen at $\alpha = 0.05$. Each value in these data represents the maximum number of pounds the athlete can bench-press. Assume that the variable is approximately normally distributed.

Athlete	1	2	3	4	5	6	7	8
Before	210	230	182	205	262	253	219	216
After	219	236	179	204	270	250	222	216

15 points

3. **Married People** In a specific year 53.7% of men in the United States were married and 50.3% of women were married. Random samples of 300 men and 300 women found that 178 men and 139 women were married (not necessary to each other).
   a. At the 0.05 significance level can it be concluded that the proportion of men who were married is greater than the proportion of women who were married?

   b. Find the 95% confidence level for the difference in the population proportions.

15 points

4. The CEO of an airport hypothesizes that the variance in number of passengers for American airports is less than the variance in number of passengers for foreign airports. At $\alpha = 0.05$, is there enough evidence to support the hypothesis? The data in millions of passengers per year are shown for selected airports. Assume the variable is normally distributed.

American Airports		Foreign Airports	
36.8	73.5	60.7	51.2
72.4	61.2	42.7	38.6
60.5	40.1		

20 points

5. **Emergency Calls and Temperature** Temperature in degrees degrees Fahrenheit and number of emergency calls are shown.

Temperature x	68	74	82	88	93	99	101
No. of Calls y	7	4	8	10	11	9	13

a. Test $\begin{matrix} H_0 : \rho = 0 \\ H_a : \rho \neq 0 \end{matrix}$ at $\alpha = 0.05$

b. Find the estimated regression line $\left(\hat{y} = a + bx\right)$

c. Interpret the meaning of the slope.

d. Find and interpret the coefficient of determination.

e. Find the standard error of the estimate (**regression standard deviation**)