First Name: _____

Last Name: _____

ID Number: _____

Prince Sultan University
STAT 271
Final Examination
First Semester 2014/2015, Term 141
Dr. Mohammed Kaouache

Question	Max points	Student's Points
1	8	
2	9	
3	8	
4	5	
5	10	
Total	40	

Time Allowed: 120 minutes

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. Mobile phones, notes and notebooks are not allowed.
4. You must fully explain all of your answers.
5. You may use the back of the pages for extra space, but be sure to indicate which question you are answering.
6. This examination consists of 5 questions and 5 pages including this one.

Q1. 8pts) To test the effectiveness of a new drug, a researcher gives one group of individuals the new drug and another group a placebo with the following results.

	Drug	Placebo
Effective	30	20
Not effective	10	12

To test the difference between the proportions of effective at the level α = 0.05, use a chi-square Test.

a. **1pt**) State the null and the alternative hypotheses.

b. **3pts**) Find the test value

c. **2pts**) Find the critical value

d. **2pts**) Make the decision and summarize your results

Q2. **9pts**) The dean of students wants to see whether there is a significant difference in ages of resident students and commuting students. He selects a sample of 50 students from each group. The ages are shown here.

Resident students : 22 25 27 23 26 28 26 24 27 ($\bar{X}_1 = 25.33$, S_1 =2.00)

Commuting students : 21 26 23 21 25 18 19 18 ($\bar{X}_2 = 21.38$, S_2 =3.07)

Assume that both populations are normally distributed and the population variances are not equal.

Let : $\mu_1 =$ mean weight of resident students

$\mu_2 =$ mean weight of commuting students

a. **3pts**) Construct a 95% CI on the difference in mean weights between the two types of students.

b. **2pts**) Use this confidence interval to test the Hypothesis (use α =0.05)

$H_0 : \mu_1 = \mu_2$ vs $H_1 : \mu_1 \neq \mu_2$

c. **4pts**) Find the p-value of the test in question b.

Q3. 8pts) The data below indicate the state gas tax in cents per gallon and the fuel use per registered vehicle (in gallons). Use these summary measures:

$\sum x$ =133 , $\sum x^2 =$ 2991 , $\sum y$ =470, $\sum y^2 =$ 38246, $\sum xy =$ 10323

Tax (x)	21	22	19	24	27	20
Usage (y)	106	63	92	68	73	68

a. **3pts**) Compute the value of the correlation coefficient

b. **2pts**) Give a brief explanation of the type of relationship between tax and usage

c. **3pts**) Determine the regression line equation

Q4. 5 pts) A random sample of monthly bills from three different providers is listed below.

Provider X: 48.20 , 70.02, 59.27, 60.59

Provider Y : 72.50 , 61.95 , 70.27 , 75.69 , 62.19

Provider Z : 89.47 , 82.11 , 77.34 , 85.25

a) At 0.05, is there evidence to conclude that there is a a difference in mean bill amounts among providers? (Use the partial computer output below).

ANALYSIS OF VARIANCE SOURCE TABLE

Source	df	Sum of Squares	Mean Square.	F	P-value
Bet Groups	?	867.40	?	?	?
W/I Groups	?	786.38	?		
Total	?	?			

Q5. 10pts) To test the claim that there is no difference in the lifetimes of two brands of handheld video games, a researcher selects a sample of videos of each brand. The lifetimes (in months) of each brand are shown here. At a α = 0.01, can the researcher conclude that there is a difference in the distributions of lifetimes for the two brands? Use the Wilcoxon rank sum test.

Brand A: 42 34 39 42 22 47 51 34 41 39 28
Brand B: 29 39 38 43 45 49 53 38 44 43

a. **2pts**) State the hypotheses.

b. **2pts**) Find the critical value.

c.4pts) Compute the test value.

d. **2pts**) Make the decision.