Prince Sultan University
STAT 271
Second Major Examination
First Semester 2014/2015, Term 141

First Name: _____

Last Name: _____

ID Number: _____

Time Allowed: 90 minutes

Question	Max points	Student's Points
1	7	
2	9	
3	6	
4	8	
Total	30	

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 4 questions and 5 pages including this one.

Q1. 7pts) The vice president of a large supermarket chain wished to determine if her customers made a list before going grocery shopping. She conducted a survey in 2 stores. The results are shown here.

	Store A	**Store B**
Made list	77	74
No list	19	22

Use a chi-square test to test the difference between the proportions of the customers who made a list at the level $\alpha = 0.10$.

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

b. 3pts) Find the test value.

c. 3pts) Make the decision and summarize your results

Q2. 9pts) The number of grams of carbohydrates contained in 1-ounce servings of randomly selected chocolate and nonchocolate candy is listed here.

Chocolate:	29	25	17	36	41	25	32	($\bar{X}_1$ =29.29, S_1^2 =62.90)
Nonchocolate:	41	41	37	29	30			($\bar{X}_2$ =35.6, S_2^2 =33.8)

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

$\mu_1 =$ the mean number of grams of carbohydrates for chocolate candy

$\mu_2 =$ the mean number of grams of carbohydrates for nonchocolate candy

a. 3 pts) Use α = 0.01. Use the Rejection Region approach to test the hypotheses

$H_0: \ \mu_1 = \mu_2$ vs

$H_1: \ \mu_1 \neq \mu_2$

b. 3 pts) Find the p-value of the test in a). Based on this p-value would you reject the null hypothesis at the significance level α = 0.05

c. 3 pts) Find and appropriate confidence interval and use it to test the hypothesis in a).

Q3. 6pts) In a random sample of 150 heads of households, 92 responded that they owned their homes. Let p be the population proportion of households who owned their homes.

a. 2pts) Test the hypotheses *H*0: *p*= 0.7 versus p $\neq$ 0.7. Use the rejection region approach. Use α =0.10.

b. 2pts) Calculate the p-value of the test in a). Based on this p-value, would you reject the null hypothesis at the α =0.05 level?

c. 2pts) Find a 95% confidence interval for p.

Q4. 8pts) hospital administrator wants to see if there is a relationship between the number
of licensed beds and the number of staffed beds in local hospitals. The data for a specific day are shown. Describe the relationship.

Licensed beds *x*	14	32	17	18	20	10	16
Staffed beds *y*	11	32	16	14	12	8	13

$\sum x$ =127, $\sum x^2 =$ 2589 , $\sum y$ = 106, $\sum y^2 =$ 1974 , $\sum xy =$ 2230

a. 3pts) Determine the regression line equation

b. 2pts) Find the standard error of the estimates

c. 3pts) Find the 95% prediction interval for the number of licensed beds(y) when number of staffed beds (x) is equal to 15.