Prince Sultan University
STAT 271
Final Examination
First Semester 2012-2013, Term 121
Wednesday, January 9th, 2013
Dr. Khaled Manasrah

Time Allowed: 120 minutes
Maximum points: 40 points
Name: _____ _____ _____ ID Number: _____
(First) (Middle) (Last)

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. Work in a neat and well-organized manner. Show your work on all problems. Please indicate your final answers clearly.
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 **9** problems, some with several parts. Make sure that your paper has all these problems.

Problem	Max Points	Points Earned
1, 2, 3	8	
4, 5	14	
6	4	
7	8	
8	6	
Total	40	

1) National data show that, on the average, college freshmen spend 7.5 hours a week texting. Rector Dr. Ahmed Yamani doesn't believe that these figures apply at PSU. He takes a simple random sample of 50 freshmen, and interviews them. He finds that the 95% confidence interval for the mean number of hours spent a week on texting is (5.72, 7.42).
   a) (1 pt) Explain to the Rector what he means by the phrase "95%" confidence.

   Now he wants to test the hypothesis that the mean for PSU is different from the national mean at a 5% significance level.

   b) (1 pt) Specify the null and alternative hypotheses for this test.

   c) (2 pts) Eager to gain favor with the Rector, you tell him that you can save him lots of time because, based on the data already presented, you know what he will conclude and he doesn't have to perform any additional calculations. Does he reject or fail to reject the null hypothesis at the 5% level? Explain.

2) (2 pts) A group of college students believes the average grades in psychology courses are different than the average grades in biology courses. The group found the average psychology grades of a sample of 8 students was 86.4 and the average biology grades of a sample of 10 students was 82.2. What are the null and the alternative hypotheses for this study?

3) (4pts) A researcher hypothesized that the variation in the car rental rates (in US$/day) at a major city airport is less than in the car rental rates down town. A survey found that the variance of the rental rates on 7 cars at the airport was 25.7 while the variance of the rental rates on 6 cars down town was 60.4. Test the claim at $\alpha = 0.05$ level.

4) A random sample of students at Prince Sultan University is asked whether they favor limiting enrollment in crowded majors as a way of keeping the quality of instruction high. The student government suspects that the plan will be unpopular among freshmen, who have not yet been admitted to a major. Here are the responses for freshmen and seniors.

	Favor	Oppose
Freshmen	40	160
Seniors	80	20

a) (4 pts) Is there strong evidence that a higher proportion of freshmen than of seniors oppose the plan at $\alpha = 0.05$? Give a p-value and state your conclusion.

b) (2 pts) Give a 95% confidence interval for the difference between the proportion of freshmen who oppose the plan and the proportion of seniors who oppose it.

5) A study is conducted to determine the relationship between a driver's age and the number of accidents he has over a 1-year period. The data are shown here.

Driver's Age x	16	24	18	17	23	27	32
No. of Accidents y	3	2	5	2	0	1	1

a) (1 pt) Compute the correlation Coefficient.

b) (1 pt) Use part (a) to describe the relationship between the driver's age and the No. of Accidents.

c) (1 pt) Determine the regression line equation.

d) (1 pt) Predict the number of accidents of a driver who is 28 years old.

e) (4 pts) Test the significance of the correlation coefficient at $\alpha = 0.05$

6) (4pts)A survey at a ballpark shows this selection of snack purchased. At $\alpha = 0.10$, is the snack chosen independent of the gender of the consumer?

	Snack		
Gender	Hot dog	Peanuts	Popcorn
Male	12	21	19
Female	13	8	25

7) A researcher wishes to try three different techniques to lower the blood pressure of individuals diagnosed with high blood pressure. The subjects are randomly assigned to three groups; the first group takes medication, the second group exercises, and the third group follows a special diet. After four weeks, the reduction in each person's blood pressure is recorded.

	Medication	Exercise	Diet
Mean	11.8	3.8	7.6
Variance	5.7	10.2	7.6
n	5	5	5

An ANOVA *F* test was run on the data. The following shows a portion of the results.

Source	Sum of Squares	df	Mean square	F
Between	160.13			
Within (error)			7.83	
Total				

a) (1 pt) Find the numerator degrees of freedom for the ANOVA *F* test.

b) (1 pt) Find the denominator degrees of freedom for the ANOVA *F* test.

c) (1 pt) State both the null and the alternative hypothesis for the ANOVA *F* test.

d) (1 pt) Find the mean square for between-group.

e) (1 pt) Find the F test value.

f) (1 pt) Find the critical value, Use $\alpha = 0.05$.

g) (1 pt) Make the decision.

h) (1 pt) Summarize the result.

8) (6 pts) The amount of caffeine is a regular (small) serving of assorted beverages are listed below. If someone wants to limit caffeine intake, does it really matter which beverage she or he chooses? Is there a difference in caffeine content at $\alpha = 0.05$? Assume the populations are not normally distributed.

Teas	Coffees	Colas
70	120	35
40	80	48
30	160	55
25	90	43
40	140	42