Prince Sultan University
STAT 271
Final Examination
First Semester 2011/2012, Term 111
Sunday, 15th January 2012
Dr. Bahha Eldin Abdalla

Time Allowed: 150 minutes

Maximum points: 60 points

Name: _____ _____ _____
(First) (Middle) (Last)

ID Number: _____ **Section:**_____

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. You must show all your work beside the problem. Be organized.
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 **12** problems, some with several parts. Make sure that your paper has all these problems

Problem	Max points	Student's Points
1,2	10	
3,4	10	
5,6	10	
7.8.9	12	
10	6	
11,12	12	
Total	**60**	

Q1 (4 points) Find the sample size needed to estimate the population mean if the margin of error is to be 0.2 of one standard deviation with 99% confidence.

Q2 (6 points) Many people sleep late on the weekends to make up for "short nights" during the workweek. The Better Sleep Council reports that 61% of us get more than 7 hours of sleep per night on the weekend. A random sample of 350 adults found that 235 had more than 7 hours of sleep each night last weekend. At the 0.01 level of significance, does this evidence show that more than 61% sleep 7 hours or more per night on the weekend?

Q3 (6 points) A random sample of 51 observations was selected from a normally distributed population. The sample mean was 98.2, and the sample variance was 37.5. Does this sample show sufficient reason to conclude that the population standard deviation is not equal to 8 at the 0.05 level of significance?

Q4 (4 points) Find the 95% confidence interval for estimating the mean difference based on these paired data and assuming normality:

Before	75	68	40	30	43	65
After	70	69	32	30	39	63

Q5 (6 points) College students have regularly insisted on freedom of choice when they register for courses. This semester there were seven sections of a particular mathematics course. The sections were scheduled to meet at various times with a variety of instructors. The following table shows the number of students who selected each of the seven sections. Do the data indicate that the students had a preference for certain sections, or do they indicate that each section was equally likely to be chosen? Use $\alpha = 0.05$.

Section	1	2	3	4	5	6	7
Number of Students	18	12	25	23	8	19	14

Q6 (4 points) Determine the critical value and the rejection region for the hypothesis test with

$$H_1 : \sigma_1 \neq \sigma_2, \text{ with } n_1 = 17, n_2 = 12, \ s_1^2 = 120, \ s_2^2 = 140 \text{ and } \alpha = 0.10.$$

Q7 (4 points) Verify the equation $\sum(y-\bar{y})^2 = \sum(y-y')^2 + \sum(y'-\bar{y})^2$ with the following data

x	0	1	2
y	1	3	2

Q8 (4 points) For the following ANOVA experiment, determine the rejection region and the critical value that are used in the traditional approach for testing the null hypothesis.

$H_0 : \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5,$ with $N = 19$ and $\alpha = 0.01$.

Q9 (4 points) In a study of 15 randomly selected ordered pairs, $r = 0.548$. Is this linear correlation coefficient significantly different from zero at the 0.10 level of significance?

Q10 (6 points) In a large city, the number of crimes per week in five precincts is recorded for five weeks. The data are shown here. At $\alpha = 0.01$, is there a difference in the number of crimes?

Precinct 1	**Precinct 2**	**Precinct 3**	**Precinct 4**	**Precinct 5**
105	88	74	56	103
108	86	83	43	98
99	91	78	52	94
97	93	74	58	88
92	82	60	62	88

Q11 (6 points) Calculate the *P*-value for each of the following hypothesis tests.

1. $F = 4.72,\ \text{d.f.N.} = 5,\ \text{d.f.D.} = 22$, two-tailed

2. $H_1 : \mu_1 - \mu_2 \neq 5,\ n_1 = 26,\ n_2 = 35,\ t = -1.8$

3. $\chi^2 = 10.571,\ n = 22,$ left-tailed

Q12 (6 points) Consider the following ANOVA table:

Source	Sum of squares	d.f.	Mean square	*F*
Between	A	4	18	E
Within	B	18	D	
Total	144	C		

1. Find A, B, C, D, and E.

2. Calculate the *P*-value of the test.

3. Determine the critical value for the Scheffe test. Use $\alpha = 0.05$.

Good-Luck