Prince Sultan University
STAT 271
Second Examination
Second Semester 2011/2012, Term 112
Wednesday, 18th April 2012
Dr. Bahaa El-din Abdalla

Time Allowed: 90 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. 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 ***5*** problems, some with several parts. Make sure that your paper has all these problems.

Problem	Max points	Student's Points
1,2	12	
3	13	
4,5	15	
Total	**40**	

Q1 (7 point) A salesperson for a new manufacturer of cellular phones claims that the percentage of defective cellular phones found among her products will be no higher than the percentage of defectives found in a competitor's line. To test this statement, a retailer took random samples of each manufacture's product. The sample summaries are given. Can we reject the salesperson's claim at the 0.01 level of significance?

Product	Number Defective	Number Checked
Salesperson's	15	150
Competitor's	6	150

Q2 (5 points) Complete the hypothesis test with alternative hypothesis $\mu_D > 0$ based on the paired data that follow and $D = B - A$. Use $\alpha = 0.05$. Assume normality.

A	700	830	860	1080	930
B	720	820	890	1100	960

Q3 (13 points) Ten salespeople were surveyed, and the average number of client contacts per month, x, and the sales volume, y, (in thousands), were recorded for each:

x	12	14	16	20	23	46	50	48	50	55
y	15	25	30	30	30	80	90	95	110	130

1. ***(1 point)*** Calculate the correlation coefficient.

2. ***(2 points)*** Find and interpret the coefficient of determination.

3. ***(5 points)*** Test the significance of the correlation coefficient at $\alpha = 0.01$. Use the *P*-value method.

4. ***(1 point)*** Determine the slope of the regression line.

5. (***3 points***) Calculate the standard error of the estimate.

6. (***1 point***) Give a point estimate for the sales volume (in thousands) for a salesman with average number of contacts per month equal to 35.

Q (3 points extra) Find the 10^{th} percentile of the t distribution if the sample size is 32.

Q4 (9 points) (a) Using the *F* distribution table, find the *P*-value interval for the following *F* test value: *F* = 7.29, d.f.N. = 5, d.f.D. = 8, two tailed.

(b) Find the critical value for a two-tailed F test with $\alpha = 0.05$ when the sample size from which the variance for the numerator was obtained was 24 and the sample size from which the variance for the denominator was obtained was 12.

(c) Compute *r* for the following data and describe the relationship between *x* and *y*. (Hint: Draw the scatter plot)

x	–3	–2	–1	0	1	2	3
y	9	4	1	0	1	4	9

Q5 (6 points) The heights (in inches) of 20 randomly selected women and 30 randomly selected men were independently obtained from the student body of a certain college in order to estimate the difference in their mean height. The sample information is given. Assume the heights are approximately normally distributed for both populations. Find the 95% confidence interval for the difference between the mean heights, $\mu_m - \mu_f$.

Sample	Mean	Standard deviation
Female (*f*)	63.8	2.18
Male (*m*)	69.8	1.92