KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS AND STATISTICS
Term 122

STAT 212: BUSINESS STATISITICS II

Final Major Exam Saturday May 25, 2013

Please check/circle your instructor's name

□ Al-Sabah □ Saleh .

Name: _____ ID #: _____ Section# _____

Important Note:
Show all your work including formulas, intermediate steps and final answer.
You may assume $\alpha = 0.05$ for testing if not otherwise stated.

Question No	Full Marks	Marks Obtained
Q1	7	
Q2	6	
Q3	22	
Q4	10	
Q5	11	
Q6	4	
Total	60	

Q1: (*7 points*) A financial analyst is comparing the returns of two types of stocks. A sample of 16 stocks type A indicates a sample mean of SR 65 and standard deviation of SR 10, and a sample of 20 from stocks type B indicates a sample mean of SR 72 and standard deviation of SR 9. Do you think that stock type B is better?

Q2: A real estate association in a community would like to study the relationship between the size of a single – family house (measured by number of rooms) and the selling price of the house (in thousands of dollars). Two different neighborhoods are included in the study, one on the east side of the community (=0) and the other in the west side (=1). A random sample of size 20 houses was selected. The estimated regression equation is:

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Price = 244 + 9.22 Rooms + 12.7 Neighborhood
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a. (*4 points*) Interpret the regression coefficient for the variables Rooms and Neighborhood.

b. (*2 points*) Provide an estimate of selling price for a house with 9 rooms located in the west side.

Q3: A businessman wants to determine which variables are important in predicting profits in a given season. He has collected data on several variables from a random sample of size 30, and these variables are coded as profits (y), X1, X2, X3, X4, X5,and X6

Use the MINITAB output given below to answer the following questions:

Regression Analysis: Y versus X1; X2; X3; X4; X5; X6

Predictor	Coef	SE Coef	T	P	VIF
Constant	87.16	21.30	4.09	0.00	
X1	-5.63	2.89	-1.95	0.07	3.884
X2	0.49	0.12	4.08	0.00	1.462
X3	0.08	0.01	8.00	0.00	1.393
X4	-0.03	0.01	-1.50	0.03	2.314
X5	-0.04	0.02	-2.00	0.01	2.554
X6	-0.08	1.39	-0.06	0.95	1.402

S = 3.19

a. (*1 point*) Write the model

b. (*8 points*) Complete the ANOVA table

Analysis of Variance

Source	DF	SS	MS	F
Regression	__	_____	____	____
Residual Error	__	_____	____	
Total	__	2948.97		

c. (*2 point*) How much of the total variation in the profit can be explained by these independent variables?

d. (*4 points*) Would you conclude that the model is significant at the 5% level? Explain.

e. (*4 points*) Which of the independent variables can be concluded to be significant in explaining the variation in profits?

f. (*2 points*) Select the best model using the MINITAB output. Clearly justify your selection.

Best Subsets Regression: Y versus X1; X2; X3; X4; X5; X6

Response is Y

Vars	R-Sq	R-Sq(adj)	Mallows Cp	S	X 1	X 2	X 3	X 4	X 5	X 6
1	56.6	55.0	99.3	6.7632	X					
1	54.0	52.4	106.7	6.9607					X	
2	80.2	78.8	33.1	4.6480	X		X			
2	70.1	67.9	62.2	5.7130		X	X			
3	88.7	87.4	10.7	3.5834	X	X	X			
3	82.0	79.9	30.1	4.5242	X		X		X	
4	90.7	89.2	6.9	3.3164		X	X	X	X	
4	90.3	88.7	8.1	3.3882	X	X	X		X	
5	92.0	90.4	5.0	3.1302	X	X	X	X	X	
5	90.7	88.8	8.8	3.3777		X	X	X	X	X
6	92.0	89.9	7.0	3.1973	X	X	X	X	X	X

Q4: A local store developed a multiplicative time-series model to forecast its revenues in future quarters, using quarterly data on its revenues during the period from 1998 to 2002. The following is the resulting regression equation:

$$\log_{10} \hat{Y} = 6.102 + 0.012\,X - 0.129\,Q_1 - 0.054\,Q_2 + 0.098\,Q_3$$

where $\hat{Y}$ is the estimated revenue

X is the coded quarterly value with X = 0 in the first quarter of 1998.

Q_1 is a dummy variable equal to 1 in the first quarter of a year and 0 otherwise.

Q_2 is a dummy variable equal to 1 in the second quarter of a year and 0 otherwise.

Q_3 is a dummy variable equal to 1 in the third quarter of a year and 0 otherwise.

a. (*2 points*) Interpret the constant 6.102 In the regression equation

b. (*2 points*) interpret the coefficient of X (0.012) In the regression equation

c. (*2 points*) interpret the coefficient of Q_2 (–0.054) In the regression equation

d. (*2 points*) Interpret the coefficient of Q_3 (0.098) in the regression equation

e. (*2 points*) What is the forecast for the revenues in the third quarter of 2003

Q5: The following data represent the yearly movie attendance in millions from 1999 to 2006.

Year	1999	2000	2001	2002	2003	2004	2005	2006
Attendance	931	939	1031	893	735	759	1013	622

a. (*2 points*) Find the first two terms of a three – year moving average.

b. (*2 points*) Using a smoothing coefficient of $W = 0.2$, Find the first two terms of the exponentially smoothed series

Model 1; the linear trend forecasting equation is given by

`Attendance = 1014 - 32.9 period time` With MAD = 12966.8

Model 2; the exponential regression model is given by

`log(Attendance) = 3.01 - 0.0184 period time` With MAD = 12710.8

c. (*4 points*) Interpret the coefficients for **both** models.

d. (*1 points*) Calculate the fitted value for 2007 using Model 2

e. (*2 points*) Which model is better? Explain.

Q6: (*4 points*) A major developer of housing communities in a city kept a record of the relative cost (in SR1000) of labor and materials in its market areas for the past three years. These data are as follows:

Years	Average Labor cost	Average Material Cost	% Material Cost
1998	49	95	67
1999	57	104	68
2000	63	110	66

Construct a Paasche index number in 2000 using 1999 as the base year.