KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT 212: BUSINESS STATISTICS I I

Semester 111
Final Major
Sunday Jan 15, 2012
7:00 - 10:00 PM

CODE 001

Please **circle** your:

Instructor	**section number**	
Musawar Malik	Sec 3: (9:00 –9:50)	
Mohammad Saleh	Sec 4: (10:00 – 10:50)	Sec 5 : (11:00 – 11:50)

Name: Student ID#: Serial #:

Important Instructions

1. Use $\alpha = 0.05$ unless it is mentions in the question
2. Use HB 2.5 pencils only.
3. Use a good eraser only. DON'T use the eraser attached to the pencil.
4. Write your name, ID number and Section number; on the examination paper and in the upper left corner of the answer sheet.
5. When bubbling your ID number and section number, be sure that the bubbles match with the number that you write.
6. The Test Code Number is already bubbled in your answer sheet. Make sue that it is the same as the printed on your question paper.
7. When bubbling, make sure that the bubbled space is fully covered.
8. When erasing a bubble, make sure that you do not leave any trace of penciling.

Molybdenum rods produced on a production line are supposed to average 2.2 inches in length. It is desired to check whether the process is in control. Let X = length of such a rod. Assume X is approximately normally distributed. Suppose a sample of size 400 rods is taken and yields a sample average length of 2 inches, and $\sum(x-\bar{x})^2 = 399$. To test H_A: $\mu \neq 2.2$ at level $\alpha = 8\%$

Use the above information's to solve the **questions from 1 to 2**

1. One would use a _____ confidence interval for μ and hence a table value of _____.

a. 92%, 1.75
b. 92%, 1.67
c. 92%, 1.41
d. 96%, 2.06
e. 96%, 1.75

2. In testing H_0, one should _____ the H_0 since the value _____ lies _____ the confidence interval.

a. Not reject, 2, within.
b. Not reject, 2.2, within.
c. Reject, 2, outside of.
d. Reject, 2.2, outside of.
e. Cannot tell, we need more information's.

3. Suppose a t-test for the hypothesis that H_0: $\mu_1 = \mu_2$ vs. H_A: $\mu_1 \neq \mu_2$ is carried out and we find $T_{STAT} = 1.8$. The descriptive significance level of the test is:

a. The probability of getting a t-value > 1.8.
b. The Type I error probability of the test.
c. The probability of getting a t-value > 1.8 or < -1.8.
d. The Type II error probability of the test.
e. We cannot tell

4. A sample of size 36 is taken from a population with unknown mean μ and standard deviation equal to 3. In a test of H_A: $\mu \neq 5$ at $\alpha = .01$, we would reject H_0 if:

a. $\bar{x} - 5 < 1.29$ or $5 - \bar{x} < 1.29$
b. $\bar{x} - 5 > 7.74$ or $5 - \bar{x} > 7.74$
c. $\bar{x} - 5 > 1.29$ or $5 - \bar{x} < 7.74$
d. $\bar{x} - 5 > 1.29$ or $5 - \bar{x} > 1.29$
e. $\bar{x} - 5 < 7.74$ or $5 - \bar{x} < 7.74$

5. A result was said to be statistically significant at the 5% level. This means:

a. The null hypothesis is probably wrong
b. The result would be unexpected if the null hypothesis were true
c. The null hypothesis is probably true
d. The alternative hypothesis is probably true
e. None of the above.

6. The critical value of a test statistic is determined from:

a. The sampling distribution of the statistic assuming H_0.
b. Calculations from the data.
c. Calculations based on many actual repetitions of the same experiment.
d. The sampling distribution of the statistic assuming H_A.
e. None of the above

7. Indicate which assumptions are needed to use the sample mean and normal tables to test a hypothesis about a population mean, and unknown variance, to test a hypothesis about μ?

I. The data are a random sample
II. The population distribution is normal
III. The sample size is large

a. I, II, and III
b. I and either II or III
c. II and III
d. only II
e. only I

8. A home owner claims that the current market value of his house is at least $40,000. Sixty real estate agents were asked independently to estimate the house's value. The hypothesis test that followed ended with a decision of "reject H_0". Which of the following statements accurately states the conclusion?

a. The home owner is wrong; he should not sell his home.
b. The home owner is right; the house is worth $40,000.
c. The home owner is right; the house is worth less than $40,000.
d. The home owner is wrong; the house is worth more than $40,000.
e. The home owner is wrong; the house is worth less than $40,000.

9. Suppose a test was taken by 36 students and the variance of the distribution of scores was 100. To test H_0: μ ≥80 vs. H_1: μ <80, using α = 0.05. Assume the population of test scores is normally distributed. What (to the nearest tenth) is the starting point of the region of rejection in terms of $\bar{x}$ values?

a. 77.6
b. 76.1
c. 76.7
d. 77.7
e. 77.3

ABC Industries undertook a training program to improve perceived job satisfaction. Its goal was to increase the perceived job satisfaction score of its employees to a mean level above 70 on a scale from 0 to 100. After the program the company sends letters to a random sample of 36 of its employees and finds that the mean satisfaction score is 74 with a sample standard deviation of 9.

10. Given the sample data, ABC should use what estimated standard error?

a. 2.667
b. 10
c. 9
d. 6
e. 1.5

11. If ABC made a type-I error this would translate to

a. concluding the mean is above 70 when it is not above.
b. Concluding incorrectly that the training program had failed.
c. Concluding incorrectly that the training program was a success.
d. Concluding the mean is not above 70 when it is above.
e. We cannot tell

12. Assume that from the data ABC calculates a test statistics 2.67. Which of the following best describes the P-value for the test?

a. P-value = 0.0038
b. P-value = 0.9962
c. P-value = 0.0076
d. P-value = 0.0500
e. P-value = 0.0050

An investigator has used a multiple regression program on 20 data points to obtain a regression equation with 3 variables. Part of the computer output is:

Variable	Coefficient	Standard Error of b(i)
1	0.45	0.21
2	0.80	0.10
3	3.10	0.86

Use the above MINITAB output to solve the **questions from 13 & 14**

13. 0.10 is an estimate of _____.

a. The population value for the standard error of the distribution of estimates of β_3.
b. The population value for the standard error of estimates of the regression model.
c. The population value for the standard error of the distribution of estimates of β_2.
d. The population value for the standard error of the distribution of estimates of y – intercept.
e. None of the above.

14. Assuming the responses satisfy the normality assumption, we can be 95% confident that the value of β_2 is in the interval,_____ ± $t_{0.025}$*_____, where $t_{0.025}$ is the critical value of the student's t distribution with ____ degrees of freedom.

a. (0.59070, 1.00930) and 19.
b. (0.58801, 1.01199) and 16.
c. 0.8, 0.1 and 16.
d. (0.48176, 1.11824) and 3.
e. (0.36973, 1.23027) and 2.

15. We are interested in finding the linear relation between the number of widgets purchased at one time and the cost per widget. The following data has been obtained:

X: Number of widgets purchased: 1 3 6 10 15
Y: Cost per widget(in dollars): 55 52 46 32 25

Suppose the regression line is $\hat{y} = -2.5X + 60$. We compute the average price per widget if 30 are purchased and observe:

a. $\hat{y}$ = -15 dollars, which is obvious nonsense. This reminds us that predicting Y outside the range of X values in our data is a very poor practice.
b. $\hat{y}$ = -15 dollars; obviously, we are mistaken; the prediction $\hat{y}$ is actually +15 dollars.
c. $\hat{y}$ = 15 dollars, which seems reasonable judging by the data.
d. $\hat{y}$ = -15 dollars, which is obvious nonsense. The regression line must be incorrect.
e. None of the above is true.

16. Suppose you are performing a simple linear regression of Y on X and you test the hypothesis that the slope β_1 is zero. You have 25 observations and your computed test statistic is 2.6. Then your P-value is given by $0.01 < P < 0.02$,

a. you would fail to reject H_0 at $\alpha = 0.02$ but reject H_0 at $\alpha = 0.01$.
b. you would reject H_0 at $\alpha = 0.02$ but fail to reject H_0 at $\alpha = 0.01$.
c. you would reject H_0 at $\alpha = 0.02$ and would reject H_0 at $\alpha = 0.01$.
d. you would fail to reject H_0 at both $\alpha = 0.02$ and $\alpha = 0.01$.
e. none of the above true.

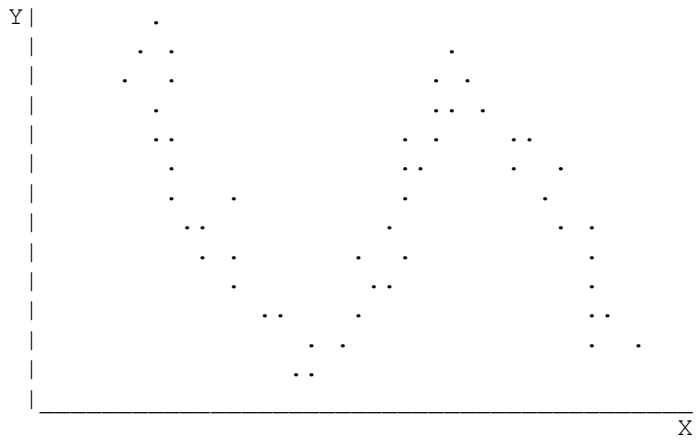
17. When testing the estimate of a linear regression coefficient based on a sample of 14 pairs, the calculated value of the F-statistic was 6.92. What is the smallest significance level at which you would reject the hypothesis H_O: $\beta_1 = 0$?

a. 0.10
b. 0.01
c. 0.05
d. 0.02
e. 0.025

18. If the correlation between age of an auto and money spent for repairs is +0.90

a. 90% of the money spent for repairs is explained by the age of the auto
b. 81% of money spent for repairs is unexplained by the age of the auto
c. 81% of the variation in the money spent for repairs is explained by the age of the auto
d. 90% of the money spent for repairs is unexplained by the age of the auto
e. none of the above

19. Suppose pairs of data values (X_i,Y_i) have been gathered and are plotted on a diagram (given below). A statistician asserts that the product-moment correlation between X and Y in this case is very low.



Which of the following comments makes the most sense?

a. We cannot tell
b. The statistician is wrong, because knowing X lets us predict the average value of Y quite accurately.
c. The statistician is wrong, because X and Y increase and decrease together.
d. The statistician is wrong, because the relationship between X and Y is not linear.
e. The statistician is right, because the correlation measures how much linear relationship there is, and the relationship is certainly not linear.

20. The McNemar test is

a. F-distribution.
b. Chi-square distributed.
c. Normal distributed.
d. T-student distribution.
e. Binomial distribution.

As a project for his business statistics class, a student examined the factors that determined parking meter rates throughout the campus area. Data were collected for the price per hour of parking, blocks to the quadrangle, and one of the three jurisdictions: on campus, in downtown and off campus, or outside of downtown and off campus. The population regression model hypothesized is

$$Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \varepsilon$$

where

Y is the meter price
X1 is the number of blocks to the quad
X2 is a dummy variable that takes the value 1 if the meter is located in downtown and off campus and the value 0 otherwise
X3 is a dummy variable that takes the value 1 if the meter is located outside of downtown and off campus and the value 0 otherwise

The following MINITAB results are obtained.

Predictor	Coef	SE Coef	T	P
Constant	0.5118	0.0136	27.4676	2.4904
x1	-0.0045	0.0034	-1.3276	0.1898
x2	-0.2392	0.0123	-19.3942	5.358E-26
X3	-0.0002	0.0123	-0.2140	0.9829

S = 0.0327 R-Sq = 96.59% R-Sq(adj) = 92.94%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	3	0.8094	0.2689	251.1995	1.096E-31
Residual Error	54	0.0580	0.0010		
Total	57	0.8675			

Use the above MINITAB output to solve the **questions from 21 to 23**

21. What is the correct interpretation for the estimated coefficient for X2?

a. All else equal, the estimated average difference in costs between parking in downtown and off campus, and parking either outside of downtown and off campus or on campus is −$0.24 per hour.
b. All else equal, the estimated average difference in costs between parking on campus, and parking outside of downtown and off campus is −$0.24 per hour.
c. All else equal, the estimated average difference in costs between parking in downtown and off campus, and parking outside of downtown and off campus is −$0.24 per hour.
d. All else equal, the estimated average difference in costs between parking in downtown and off campus, and parking on campus is −$0.24 per hour.
e. We cannot tell

22. Predict the meter rate per hour if one parks outside of downtown and off campus 3 blocks from the quad.

a. $−0.0139
b. $0.4981
c. $0.2589
d. $0.2604
e. $-0.4981

23. If one is already outside of downtown and off campus but decides to park 3 more blocks from the quad, the estimated average parking meter rate will

a. decrease by 0.0135.
b. decrease by 0.0045.
c. decrease by 0.0139.
d. decrease by 0.4979.
e. decrease by 0.4445.

In Hawaii, condemnation proceedings are under way to enable private citizens to own the property that their homes are built on. Until recently, only estates were permitted to own land, and homeowners leased the land from the estate. In order to comply with the new law, a large Hawaiian estate wants to use regression analysis to estimate the fair market value of the land. The following model was fit to data collected for n = 20 properties, 10 of which are located near a cove.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_1 X_2 + \beta_4 X_1^2 + \beta_5 X_1^2 X_2 + \varepsilon$$

where Y = Sale price of property in thousands of dollars
X1 = Size of property in thousands of square feet
X2 = 1 if property located near cove, 0 if not
Using the data collected for the 20 properties, the following partial output obtained from MINITAB is shown:

Predictor	Coef	SE Coef	T	P
Constant	- 32.1	35.7	- 0.90	0.3834
Size	12.2	5.9	2.05	0.0594
Cove	- 104.3	53.5	- 1.95	0.0715
Size*Cove	17.0	8.5	1.99	0.0661
SizeSq	- 0.3	0.2	- 1.28	0.2204
SizeSq* Cove	- 0.3	0.3	- 1.13	0.2749

S = 9.5 R-Sq = 98.5% R-Sq(adj) = 97.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	28324	5664	62.2	0.0001
Residual Error	14	1279	91		
Total	19	29063			

Use the above MINITAB output to solve the **questions from 24 to 26**

24. Is the overall model statistically adequate at a 0.05 level of significance for predicting sale price (Y)?

a. No, since the standard deviation of the model is fairly large.
b. No, since all the individual variables are not significant, all p-value's more than 0.05.
c. Yes, since the p-value for the test is smaller than 0.05.
d. Yes, since none of the β-estimates are equal to 0.
e. We cannot tell

25. Given a quadratic relationship between sale price (Y) and property size (X1), what null hypothesis would you test to determine whether the curves differ from cove and non-cove properties?

a. H_0: $\beta_2 = 0$
b. H_0: $\beta_2 = \beta_3 = \beta_5 = 0$
c. H_0: $\beta_4 = \beta_5 = 0$
d. H_0: $\beta_1 = \beta_5 = 0$
e. H_0: $\beta_3 = \beta_5 = 0$

26. Given a quadratic relationship between sale price (Y) and property size (X1), what test should be used to test whether the curves differ from cove and non-cove properties?

a. F test for the entire regression model.
b. Partial F test on the subset of the appropriate coefficients.
c. t test on each of the coefficients in the entire regression model.
d. t test on each of the subsets of the appropriate coefficients.
e. We cannot tell

A study was conducted to predict the company stock price using several variables that were taken into consideration. The list of variables is as follows;
Y: Stock price as of 9/6/91.
X1: Annual 3-S-year growth rate in sales as a percentage
X2: Total sales in millions of dollars for last four quarters.
X3: Earnings per share annual growth rate as a percentage.
X4: Profits for last four quarters.
X5: Stock price 1 year earlier.
X6: Price earnings (P/E) ratio over last four quarters
X7: Stock Market for which the company is traded,(1: if Over the Counter (OTC), 2: if New York Stock Exchange (NYSE), 3: if NASDAQ)

Minitab analysis was conducted and gave the following results;

Correlations: Y, X1, X2, X3, X4, X5, X6, X8, X9

	Y	X1	X2	X3	X4	X5	X6	X8
X1	-0.068							
	0.503							
X2	0.160	-0.090						
	0.112	0.375						
X3	0.014	0.057	-0.107					
	0.890	0.572	0.289					
X4	0.371	-0.079	0.609	0.053				
	0.000	0.437	0.000	0.601				
X5	0.330	-0.114	0.224	-0.099	0.239			
	0.001	0.257	0.025	0.326	0.017			
X6	0.294	0.025	-0.128	-0.220	-0.082	0.077		
	0.003	0.805	0.204	0.028	0.416	0.449		
X8	0.032	-0.019	-0.256	0.017	-0.143	-0.174	-0.054	
	0.753	0.855	0.010	0.868	0.156	0.084	0.591	
X9	0.000	0.025	0.268	0.150	0.187	0.114	-0.125	-0.804
	0.997	0.806	0.007	0.135	0.062	0.260	0.215	0.000

Cell Contents: Pearson correlation
P-Value

Best Subsets Regression: Y versus X1, X2, X3, X4, X5, X6, X8, X9

Response is Y

			Mallows		X	X	X	X	X	X	X	X
Vars	R-Sq	R-Sq(adj)	Cp	S	1	2	3	4	5	6	8	9
1	13.8	12.9	20.7	18.714				X				
1	10.9	10.0	24.7	19.028					X			
2	24.4	22.8	8.4	17.614				X		X		
2	19.9	18.3	14.4	18.125				X	X			
3	29.1	26.9	4.0	17.146				X	X	X		
3	25.6	23.2	8.8	17.569				X		X	X	
4	31.1	28.1	3.4	16.997				X	X	X	X	
4	29.9	26.9	4.9	17.141			X	X	X	X		
5	32.1	28.5	3.9	16.952				X	X	X	X	X
5	31.8	28.2	4.3	16.990			X	X	X	X	X	
6	32.6	28.2	5.3	16.986			X	X	X	X	X	X
6	32.4	28.0	5.5	17.011		X		X	X	X	X	X
7	32.7	27.6	7.1	17.061		X	X	X	X	X	X	X
7	32.6	27.5	7.2	17.071	X		X	X	X	X	X	X
8	32.8	26.9	9.0	17.147	X	X	X	X	X	X	X	X

Stepwise Regression: Y versus X1, X2, X3, X4, X5, X6, X8, X9

Forward selection. Alpha-to-Enter: 0.05

Response is Y on 8 predictors, with N = 100

Step	1	2	3
Constant	19.94	14.74	15.39
X4	0.115	0.123	0.106
T-Value	3.96	4.50	3.85
P-Value	0.000	0.000	0.000
X6		0.164	0.153
T-Value		3.69	3.52
P-Value		0.000	0.001
X5			0.117
T-Value			2.52
P-Value			0.013
S	18.7	17.6	17.1
R-Sq	13.79	24.40	29.10
R-Sq(adj)	12.91	22.84	26.89

Regression Analysis: Y versus X1, X2, X3, X4, X5, X6, X8, X9

Predictor	Coef	SE Coef	T	P	VIF
Constant	6.488	7.500	0.86	0.389	
X1	-0.01078	0.03712	-0.29	0.772	1.024
X2	-0.001249	0.002846	-0.44	0.662	1.781
X3	0.01241	0.01815	0.68	0.496	1.170
X4	0.11505	0.03439	3.35	0.001	1.668
X5	0.13332	0.04723	2.82	0.006	1.119
X6	0.17457	0.04625	3.77	0.000	1.151
X8	11.162	6.489	1.72	0.089	3.213
X9	7.502	7.194	1.04	0.300	3.301

S = 17.1469 R-Sq = 32.8% R-Sq(adj) = 26.9%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	___	13051.6	1631.5	5.55	0.000
Residual Error	___	26755.4	294.0		
Total	___	39807.0			

Use the above MINITAB output to solve the **questions from 27 to 35**

27. From the correlation analysis, the predictor that is LEAST significant to the response Y is:

a. X4
b. X9
c. X5
d. X6
e. All the variables

28. From the correlation analysis, the predictor that is MOST significantly related to the other variables is:

a. X9
b. X5
c. X6
d. X2
e. All the variables

29. From the correlation analysis, the predictor that will be deleted first using backward elimination is

a. X9
b. X4
c. X5
d. X6
e. All the variables

30. In testing the validity of the overall regression model, the numerator and denominator degrees of freedom (respectively) for the critical value of F will be:

a. 8 & 91.
b. 9 & 99.
c. 9 & 91.
d. 8 & 99.
e. None of the above.

31. From the best subsets regression analysis, According to the C-p value, number of the acceptable models

a. 6
b. 9
c. 10
d. 1
e. 7

32. From best subsets regression analysis, the number of predictors in the best regression model is:

a. 5
b. 6
c. 7
d. 3
e. 4

33. From the regression analysis of the FULL model, the correlation between X2 and the other predictors is:

a. Not significant
b. Significant
c. Almost zero
d. Inadequate
e. None of the above

34. From the regression analysis of the FULL model, to test H_0 $\beta_8 \leq 0$, the P – value equal to

a. 0.089
b. 0.0445
c. 0.179
d. 0.9555
e. None of the above

35. For the standard stepwise regression analysis and using the full model analysis, calculate the C-p

a. - 10.70440
b. - 11.58805
c. 5.06547619
d. 4.01041667
e. We cannot find the c- p

The demand for a product in each of the last five months is shown below.

Month	1	2	3	4	5
Demand ('00s)	13	17	19	23	24

Use the data above to solve the **questions 36 & 37**

36. Use a two month moving average to generate a forecast for demand in month 6.

a. 1500
b. 2350
c. 1800
d. 2100
e. 15.0

37. Apply exponential smoothing with a smoothing constant of 0.9 to generate a forecast for demand for demand in month 6.

a. 1660
b. 2386
c. 1876
d. 2258
e. 16.6

Given below are the average prices for three types of energy products in the United States from 1992 to 1994

Year	Electricity	Natural Gas	Fuel Oil
1992	43.205	25.893	0.892
1993	16.959	28.749	0.969
1994	47.202	28.933	1.034

Using the above information to solve the **questions from 38 & 39**

38. What are the simple price indexes for electricity, natural gas and fuel oil, respectively, in 1993 using 1992 as the base year?

a. 39.252, 111.741 and 115.919
b. 39.252, 111.030 and 92.054
c. 39.252, 111.030 and 108.632
d. 39.252, 111.741 and 93.713
e. None of the above

39. What is Paasche price index number for the group of three energy items in 1993 for a family that consumed 18 units of electricity, 30 units of natural gas and 202 units of fuel oil in 1993 using 1992 as the base year?

a. 127.22
b. 78.60
c. 111.07
d. 111.38
e. Can’t be determined from the above information

The following trend line was calculated from quarterly sales in ($1,000) for 2004 – 2008. $\hat{y} = 0.07 + 0.005t$ Where t = 1 for the first quarter of 2004 (summer). The seasonal indexes computed from the trend line for the four quarters of the year 2008 were .85, 1.05, 1.15, and .80, respectively and the Durbin-Watson statistic = 0.95.

Using the above information to solve the **questions from 40 to 42**

40. The seasonalized forecast for the second quarter of the year 2009 is:

a. 0.076
b. 0.171
c. 0.189
d. 0.081
e. 0.180

41. If summer 2008 sales were $12,600, then the deseasonalized 2008 summer sales value would be:

a. $14,823.53
b. $12,000
c. $10,956.52
d. $15,750
e. $12,600

42. If you want to test if a positive autocorrelation. Using 1% level of significance, the decision you should make is

a. There is a positive autocorrelation.
b. Cannot decide.
c. There is a negative autocorrelation
d. There is no autocorrelation
e. None of the above

A major portion of total customer credit is extended in the categories of automobile loans. Loan amounts outstanding (in billion of dollars) for the period 1990-2007 are summarized in the MINITAB output below.

Predictor	Coef	SE Coef	T	P
Constant	239.05	46.12	5.18	0.000
time	1.472	4.260	0.35	0.734

S = 93.78 R-Sq = 0.7% R-Sq(adj) = 0.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	1049	1049	0.12	0.734
Residual Error	16	140704	8794		
Total	17	141754			

Durbin-Watson statistic = 1.04

Using the above information, answer the **questions from 43 to 45**

43. Find the forecast cost for the automobile loans in 2008

a. 265.546
b. 267.018
c. 346.506
d. 240.522
e. None of the above

44. Find the forecast error in 2007, if the actual automobile loans is 415.6

a. 150.054
b. – 148.582
c. – 150.054
d. 148.582
e. None of the above

45. Find the mean squared error of the forecast model

a. 7816.889
b. 8276.706
c. 8794
d. 9893.25
e. None of the above

A contractor developed a multiplicative time-series model to forecast the number of contracts in future quarters, using quarterly data on number of contracts during the 3-year period from 1996 to 1998. The following is the resulting regression equation:

$$\ln \hat{Y} = 3.37 + 0.117\,X - 0.083\,Q_1 + 1.28\,Q_2 + 0.617\,Q_3$$

Where $\hat{Y}$ is the estimated number of contracts in a quarter
X is the coded quarterly value with X = 0 in the first quarter of 1996.
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.

Use the above information to solve the **questions from 46 to 48**

46. The best interpretation of the coefficient of Q3 (0.617) in the regression equation is:

a. The number of contracts in the third quarter of a year is approximately 314% higher than the average over all 4 quarters.
b. The number of contracts in the third quarter of a year is approximately 62% higher than the average over all 4 quarters.
c. The number of contracts in the third quarter of a year is approximately 62% higher than it would be during the fourth quarter.
d. The number of contracts in the third quarter of a year is approximately 314% higher than it would be during the fourth quarter
e. There is no meaning

47. Using the regression equation, which of the following values is the best forecast for the number of contracts in the second quarter of 2000?

a. 144212
b. 4355119
c. 391742
d. 1238797
e. We cannot find the forecast

48. In testing the coefficient for Q1 in the regression equation (– 0.083), the results were a t-statistic of – 0.66 and an associated p-value of 0.530. Which of the following is the best interpretation of this result?

a. The number of contracts in the first quarter of the year is significantly different than the number of contracts in an average quarter.
b. The number of contracts in the first quarter of the year is not significantly different than the number of contracts in the fourth quarter for a given coded quarterly value of X.
c. The number of contracts in the first quarter of the year is not significantly different than the number of contracts in an average quarter.
d. The number of contracts in the first quarter of the year is significantly different than the number of contracts in the fourth quarter for a given coded quarterly value of X.
e. We cannot test.

Conduct a test to determine whether the two classifications A and B are independent, using the data in the accompanying table and $\alpha = 0.01$

	B_1	B_2
A_1	42	28
A_2	23	57

Use the above information to answer **the questions 49 & 50**

49. The alternative hypothesis

a. The percentage of A and B are equal.
b. The two variables are independent.
c. The two variables are dependent.
d. The mean for A equal the mean for B.
e. None of the above.

50. If the test statistic equal to 14.847 then your conclusion is

a. The two variables are dependent.
b. The two variables are independent.
c. The percentage of A and B are equal.
d. The mean for A equal the mean for B.
e. None of the above.