SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematical Science
STAT-212-Term051-Quiz #6

Name: ID: Serial:

Question One (8-Points)

You are given the following MINITAB output for the estimated regression equation involving a dependent and two independent variables; Use this out put to answer the next questions:

Predictor	Coef.	SE Coef	T	P
Constant	-7.351	3.485	-2.11	0.061
X1	0.11273	0.02969	3.80	0.004
X2	0.34900	0.07131	4.89	0.001

S = 4.379 R-Sq = 94.8% R-Sq(adj) = 93.8%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	2	3529.9	1765.0	92.03	0.000
Residual Error	10	191.8	19.2		
Total	12	3721.7			

a. The number of observations is:---------- $n-1=12 \Rightarrow n=13$ 1

b. The regression equation is:

$\hat{y} = -7.351 + 0.11273 X_1 + 0.34900 X_2$ 1

c. Interpret the value of b_1

Interpretation:

1 As x_1 increases by one unit, y increases by 0.11273 units holding x_2 fixed.

d. Does the over all model significant? Why? Use $\alpha = .05$

Answer (Yes\No):-------- Yes 1

Explanation:

p-value = 0.000 < α (or $F_c = 92.03$ large) 1

e. Which, if any, of the independent variables is statistically significant? Use $\alpha = .05$

All are significant, because for $\beta_1 \rightarrow$ p-value = 0.004 < α

1 $\beta_2 \rightarrow$ p-value = .001 < α

So we reject $H_0: \beta_1 = 0$ and $H_0: \beta_2 = 0$

f. Find the values of SSR, and SSE

SSR = 3529.9 SSE = 191.8

1 1

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Question Two (6-Points)

Answer the following questions as true or false:

a. If the R-square for a multiple regression model with two independent variables is .64, the correlation between the two independent variables will be .80. ---False

b. A dummy variable is a dependent variable whose value is set at either zero or one.--False

c. If one independent variable affects the relationship between a second independent variable and the dependent variable, it is said that there is interaction between the two independent variables.---------True

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Question Three (2+4 = 6-Points)

You are given the following MINITAB output of one dependent and three independent variables, the correlation matrix and two residual graphs.

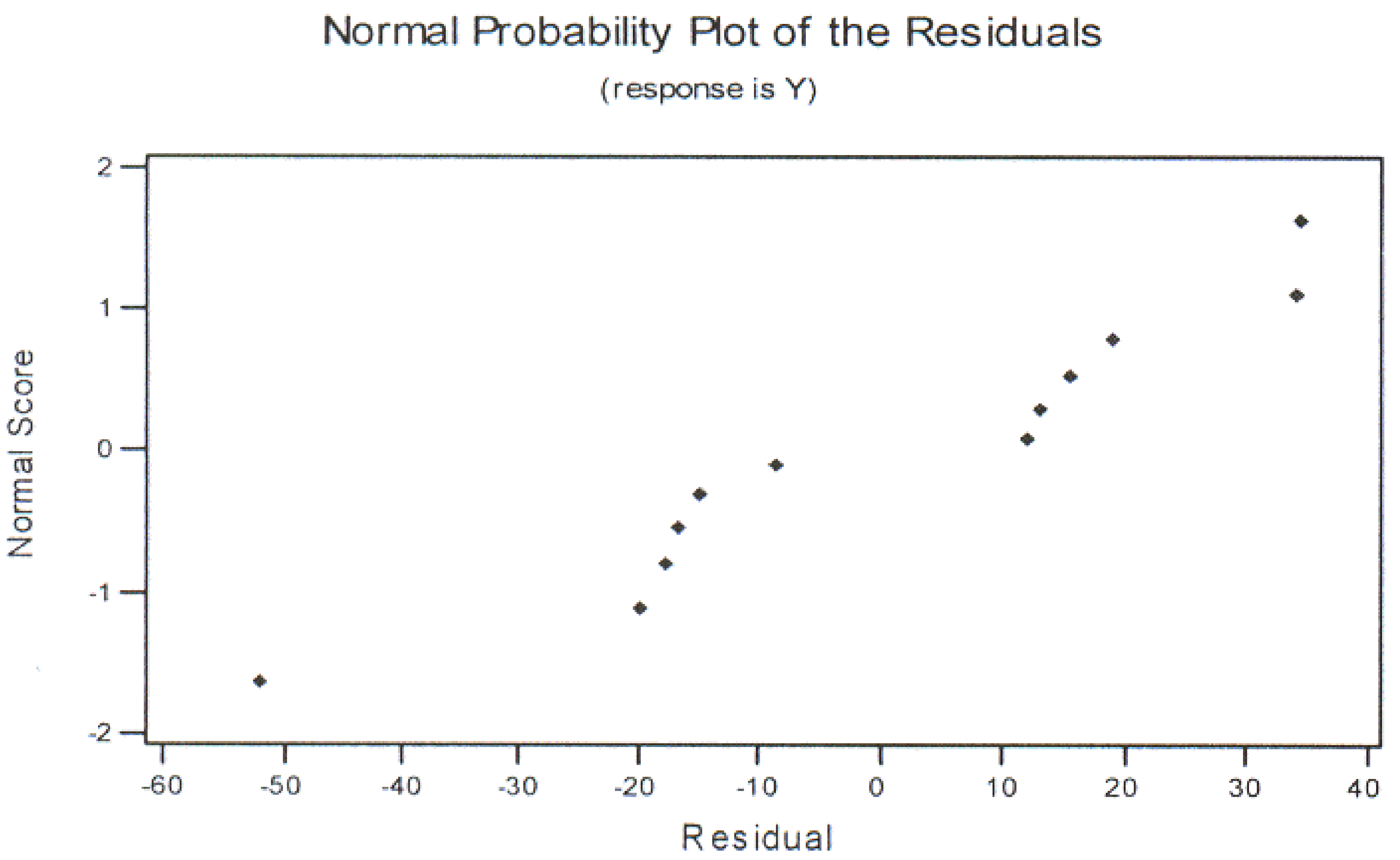
Correlations: Y, X1, X2, X3

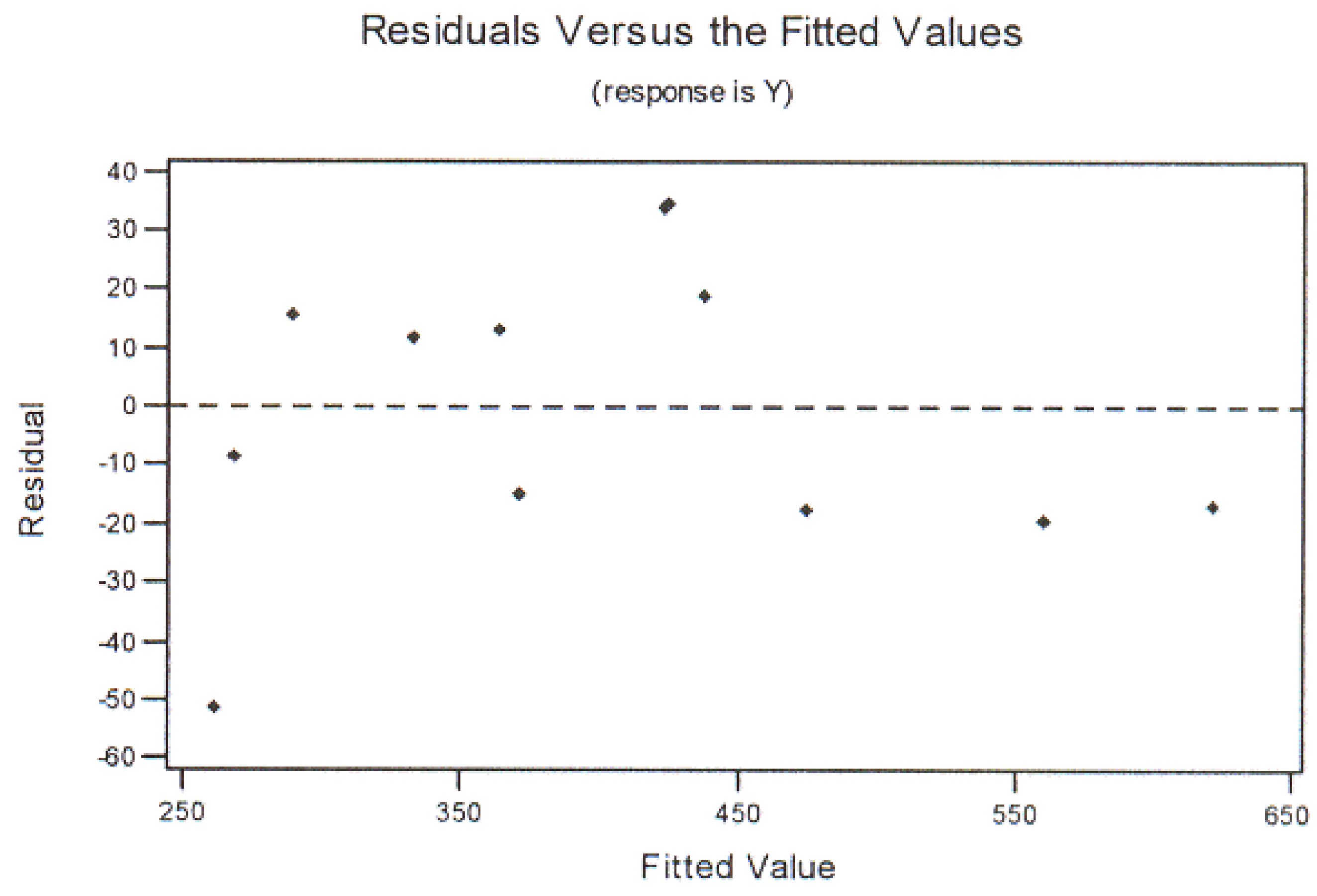
	Y	X1	X2
X1	0.350		
	0.058		
X2	0.668	0.763	
	0.000	0.000	
X3	-0.179	-0.020	-0.125
	0.345	0.916	0.512

a. Which variable will enter the model-by forward selection method – and why?

X_2, because it has the highest value of Correlation with Y $r = .668$ and it is significant.

2





b. What can you conclude about the error assumptions ?

None of the error assumptions is justified

4