Full Name:

Quiz #3
BIOSTAT 705 Spring 2024

1. (4 pts) In a multiple linear regression with 3 predictors, when $H_0 : \beta_1 = \beta_2 = \beta_3 = 0$, has been rejected, the interpretation should be: (circle the correct answer)

   a) There is no linear relationship between y and any of the three predictors.

   b) All three predictors have a slope of zero.

   c) All three predictors have equal slopes.

   d) There is a linear relationship between y and at least one of the three predictors.

   e) There is a linear relationship between y and all three predictors.

2. (2 pts) In stepwise selection method, variable enters the model will remain in the model? (True or False) Not necessarily. May be removed

3. (2 pts) Mallow's C_p for the full model is equal to number of predictors in the model? (True or False) Number of parameters

4. (2 pts) PRESS=$\sum_{i=1}^{n}(\frac{e_i}{1-h_{ii}})^2$ is larger than SSE=$\sum_{i=1}^{n} e_i^2$? (True or False)

5. A data set consist of $n = 32$ observations on the dependent variable Y, and four predictors X_1, X_2, X_3, and X_4. Below is a summary of variable selection:

var	SSE	R^2	adjR^2	CP	AIC	BIC	Variables in Model
1	330	0.71304	0.70348	8.6667	78.667	81.599	X2
1	448	0.61043	0.59745	21.7778	88.450	91.381	X3
1	505	0.56087	0.54623	28.1111	92.282	95.214	X1
1	785	0.31739	0.29464	59.2222	106.398	109.330	X4
2	255	0.77826	0.76297	2.3333	72.417	76.814	X2,X4
2	284	0.75304	0.73601	5.5556	75.864	80.261	X2,X3
2	290	0.74783	0.73043	6.2222	76.533	80.930	X1,X3
2	295	0.74348	0.72579	6.7778	77.080	81.477	X1,X2
2	402	0.65043	0.62633	18.6667	86.983	91.380	X1,X4
2	445	0.61304	0.58636	23.4444	90.235	94.632	X3,X4
3	245	0.78696	0.76413	3.2222	73.137	79.000	X1,X2,X4
3	253	0.78000	0.75643	4.1111	74.165	80.028	X1,X2,X3
3	255	0.77826	0.75450	4.3333	74.417	80.280	X2,X3,X4
3	290	0.74783	0.72081	8.2222	78.533	84.396	X1,X3,X4
4	243	0.78870	0.75739	5.0000	74.874	82.203	X1,X2,X3,X4

a) (6 pts) Based on above, suggest a 'best' subset of variable(s) to be considered in a model. Write-down your selected regression model?

Y = \beta_0 + \beta_2 X_2 + \beta_4 X_4 + \epsilon

b) (4 pts) Complete ANOVA table below for selected regression model in part (a):

Source	df	SS	MS	F
Regression	2	895	447.5	50.9 ~ F(2, 29)
Error	29	255	8.79	
Total	31	1150		