Name _____

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Reading Quiz for Sheather Chapter 7 (Sections 1 & 2)

1. Consider the models M1 and M2:

$$M1: y = X\beta + \epsilon$$
$$M2: y = X'\beta' + \epsilon'$$

where X is an $n \times (p_1 + 1)$ matrix with a column of 1's in the first column, X' is an $n \times (p_2 + 1)$ matrix with a column of 1's in the first column.

• Allan took an applied regression class where he learned to use

$$AIC_{Allen} = -2\log L(\hat{\beta}, \hat{\sigma}^2) + 2(p+2)$$

• Alice took a different applied regression class where she learned to use

$$AIC_{Alice} = -2\log L(\hat{\beta}, \hat{\sigma}^2) + 2p$$

For the purposes of comparing model M1 with model M2, will it make any difference whether we use AIC_{Allen} or AIC_{Alice} ? Why or why not?

[turn over for problem #2]

- 2. Suppose we have five regression models, M1, M2, M3, M4 and M5, all five models have the same number of predictors *p*, and they were all fitted on the same data set with *n* observations. Suppose RSS is smallest for M4, among all five models. Mark each statement below as true or false
 - (a) T or F : R^2 must be largest for M4, among these models.
 - (b) T or F : AIC must be smallest for M4, among these models.
 - (c) T or F : BIC must be smallest for M4, among these models.

You do not have to give any explanation or show any work. Just circle T or F for each statement above.