Quiz #2
BIOSTAT 705 Spring 2024

1. For each statement below indicate (True or False):

   a) (1 pts) SSE(reduced) < SSE (full)?
   True ~~(False)~~

   b) (2 pts) A linear regression model is considered additive when the interaction term is significant?
   True ~~(False)~~

   c) (2 pts) The "hat" matrix $[\mathrm{H} = X(X'X)^{-1}X']$ is idempotent and its rank equal to the sum of its diagonal values?
   ~~(True)~~ False

   d) (2 pts) SSE(full)-SSE(reduced)=SS_{reg}(full)-SS_{reg}(reduced)?
   True ~~(False)~~

2. Data was collected on 24 subjects and fitted with a regression model,
   $\mathrm{Y} = \beta_0 + \beta_1 \mathrm{X}_1 + \beta_2 \mathrm{X}_2 + \beta_3 \mathrm{X}_3 + \epsilon$

   a) (7 pts) Complete the df, SS and MS in the ANOVA table below:

Source	df	SS	MS
Reg.(X_1, X_2, X_3)	3	300	100 150
X_1	1	150	
$X_2\|X_1$	1	100	100
$X_3\|(X_1, X_2)$	1	50	50
Error	20	500	25
Total	23	800	

   b) (3 pts) Testing the global null hypothesis, then F = 4 ~ F(3, 20)?
   ~~(True)~~ False

   c) (3 pts) Testing the contribution of X_3 given (X_1, X_2) are in the model, then we use partial F-test below:

   $$F = \frac{[\mathrm{SSE}(X_1, X_2, X_3) - \mathrm{SSE}(X_1, X_2)]/1}{\mathrm{MSE}_{\mathrm{full}}}$$

   True ~~(False)~~