STA 314H1S: Quiz 2

Time allowed: 10 minutes; Total points: 10

Student Name: _____ Student ID: _____

Please make sure your name and ID are also written clearly on your printout, and remember to hand in your printout together with the quiz. There will be 4 points for your printout. Answer the following question based on your code/output for the computation problem in the problem set 2.

1. (2 pts) For part(a), suppose you keep the same value of σ in your original answer, but increase the dimension of your feature from $p = 500$ to $p = 800$. What will happen to the proportion of variance in $\mathbf{y}$ explained by $\mathbf{x}$? Also, based on your answer to part(a), provide an estimate of the Bayes error in this model.

2. (2 pts) For part(e), how will you change your code to implement a *Leave-one-out CV* instead? Circle the line of source code that you will change in your printout, and explain how will you change it in the space provided below, *without using any analytical formula for the average MSE*. Do you expect the total computation time to increase or decrease due to this change?

3. (2 pts) In part (g), if it is no longer given that $\mathbb{E}(\mathbf{x}) = \mathbf{0}$, can you compute the sample PC directions using the result from `eigen(t(X)%*%X)` in `R`? Provide an explanation for your answer. If the answer is no, suggest what would be an alternative approach (here `X` denotes the design matrix and `t(X)` is its transpose.)