MATH389: Exam 01 – Take Home

This is the take-home portion of the first exam. There is only one question. Please bring a piece of paper with your answers to the question (and nothing else) to the exam. You will fill in the answers on the exam itself. You are expected to work on this question on your own without any direct assistance. The use of notes and static internet resources are all allowed.

1. Take the mile per gallon dataset found here:

`https://statsmaths.github.io/ml_data_ans/mpg.csv`

and build a model matrix using only an intercept and the variable `hwy` to predict the response `cty`. Compute the (a) the smallest and largest singular values of the model matrix X and (b) the regression vector β. You can do the latter using any method that you would like.