Assignment 6

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Problem 1. Recursive Binary Splitting. The Figure 1 below plots the tree structure using recursive binary splitting. The first variable to split is dem, a dummy equal to one if respondent is Democrat, which is reasonable to have here. For example, the first left leaf in the bottom shows that non-partisan male respondents have a colder/worse feeling than their female peers (shown as the second left leaf in the bottom). The mean squared error of this tree of dept 3 and 8 leaves is 392.1875.

Problem 2. Tuning the Tree. The optimal tuning parameter values are max depth=3, min samples leaf = 2 and min samples split = 9.The MSE of the optimal results is -404.710. Comparing the absolute value of MSE, our tree in part (1) works better.

Problem 3. Random Forest Regression. The tuning parameter values for the random forest regression are max depth=10, max features=2, min samples leaf= 19, min samples split= 11, n estimators= 200. The MSE of

the model is -397.641. Again, comparing to the tree in part (1), it has a higher MSE.

Figure 1: Regression Tree for Question 1