

## Homework 2

### Exercises 1.1

#### 3.7.1

The null hypothesis for the table is that budgets to advertise on “TV”, “Radio”, and “Newspaper” do not affect the sales or products. The p-values indicate that the budget spent on “TV” and “Radio” to advertise is affecting sales, while money spent on “Newspaper” is not.

#### 3.7.3

- a. The answer is option iii because in the situation that it is a college graduate, there is a negative coefficient factor associated with.  $\widehat{\beta}_5 = -10$ , and it only negatively affects the response variable when the person is level 1, or in college. So in the case that a highschooler has a certain GPA and a fixed IQ, they are able to have a greater salary.
- b.  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$ . GPA=4.0, IQ=110, Level=1, then  $Y = 50 + 20(4) + 0.07(110) + 35(1) + 0.01(4.0 \cdot 110) + (-10)(4.0 \cdot 1) = 137.1$  thousands of dollars is the salary.
- c. False because the coefficient isn't what determines the effect, only the weight. In order to truly see the effect we can set the null hypothesis of GPA/IQ interaction to 0, and then get a linear model and use p-value to come to a conclusion.

#### 3.7.4

- a. We need more information about the training data because while the cubic RSS will better fit the model, the linear RSS is closer to the true model. The cubic model has the ability to fit better which can lead to lower RSS, but it wouldn't be accurate since the model is truly linear.