Lab 4F: Some Models Have Curves Response Sheet

Directions: Record your responses to the lab questions in the spaces provided.

Problems with lines

• Describe, in words, how the line fits the data. Are there any values for critics_rating that would make obviously poor predictions?

• Compute the MSE of the model for the testing data and write it down for later.

Making bend-y models

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• What is the role of the number 2 in the poly() function?

Write down the model equation in the form:

 $y = a + bx + cx^2$

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Comparing lines and curves

• Compare how the *line of best fit* and the *quadratic* model fit the data. Use the difference in each model's testing MSE to describe why one model fits better than the other.

On your own

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• Create a model that predicts audience_rating using a 3 degree polynomial (called a cubic model) for the critics_rating using the training data.

By using a plot, describe why you think a 2 or 3 degree polynomial will make better predictions for the testing data.

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• Compute the MSE for the model with a 3 degree polynomial and use the MSE to justify whether the 2 or 3 degree polynomial fits the testing data better.

Using the linear model from above which has the smallest MSE, include an additional numerical variable to the model and recompute the MSE. Does modeling the variable you chose as a quadratic polynomial improve the MSE further?