Name_____ Date_____

LAB 4F: Some models have curves
Response Sheet

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

Making models do yoga

- **Before moving on, load the `movie` data and split it into two sets:**
- **A set named `training` that includes 75% of the data.**

- **And a set named `testing` that includes the remaining 25%.**

Problems with lines

- **Train a linear model predicting `audience_rating` based on `critics_rating` for the `training` data. Assign this model to `movie_linear`.**

- **Fill in the blanks below to create a scatterplot with `audience_rating` on the y-axis and `critics_rating` on the x-axis using your `testing` data.**

```
xyplot(_________~_________, data = _________)
```

- **Run the code below to add the *line of best fit* for the `training` data to the plot.**

```
add_curve(movie_linear)
```

- **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.**

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Adding flexibility

Making bend-y models

- **Fill in the blanks below to train a quadratic model predicting `audience_rating` from `critics_rating`, and assign that model to `movie_quad`.**

```
movie_quad <- lm(_________ ~ poly(_________, 2), data = training)
```

- **What is the role of the number `2` in the `poly()` function?**

Comparing lines and curves

- **Fill in the blanks below to**
- **create a scatterplot with `audience_rating` on the y-axis and `critics_rating` on the x-axis using your `testing` data, and**

- **add the** *line of best fit* **and** *best fitting quadratic curve*.

- **Compare how the** *line of best fit* **and the** *quadratic* **model fit the data. Which do you think has a lower `test` MSE?**

- **Compute the MSE of the quadratic model for the `test` data and write it down for later**.

- **Use the difference in each model's `test` MSE to describe why one model fits better than the other**.

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On your own

- **Create a model that predicts `audience_rating` using a cubic curve (polynomial with degree `3`), and assign this model to `movie_cubic`.**

- **Create a scatterplot with `audience_rating` on the y-axis and `critics_rating` on the x-axis using your `test` data.**

- **Using the names of the three models you have trained, add the** *line of best fit*, *best fitting quadratic curve*, **and** *best fitting cubic curve* **for the `training data` to the plot.**

- **Based on the plot, which model do you think is the best at predicting the `testing` data?**

- **Use the difference in testing MSE to verify which model is the best at predicting the `testing data`.**