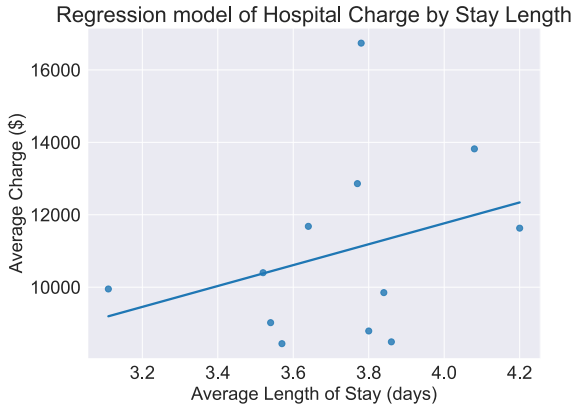
Problem 1: 0 points
Consider the following hospital data (also included in `hospital.csv`). We would like to determine if the average length of stay can predict the average hospital charge and use it to make a prediction for the charge when a patient stays for 4 days. Perform a regression analysis to determine the answer to this question. Use $\alpha = 0.10$ when required. Consider each state to be a single data point.

State	Average Charge ($)	Average Length of Stay (days)
Massachusetts	11680	3.64
New Jersey	11630	4.2
Pennsylvania	9850	3.84
Minnesota	9950	3.11
Indiana	8490	3.86
Michigan	9020	3.54
Florida	13820	4.08
Georgia	8440	3.57
Tennessee	8790	3.8
Texas	10400	3.52
Arizona	12860	3.77
California	16740	3.78

Let x be the average length of stay (days) and y be the average charge ($).

- BLUF: This data does not support a linear model that provides meaningful predictions of average charge based on average length of stay.
- Hypothesized model: $\hat{y} = 224 + 2885x$
- Scatterplot



- Parameter estimates: Intercept: $\hat{\beta}_0 = 224$. Slope: $\hat{\beta}_1 = 2885$.
- Coefficient of determination: $r^2 = 0.105$
- Hypothesis test
  - Hypotheses: $H_0 : \beta_1 = 0 \quad H_a : \beta_1 \neq 0$
  - Test Statistic: $t = 1.0836$
  - P-value: $p = 0.3040$
  - Technical Conclusion: We fail to reject the null hypothesis.
- Prediction: For $x = 4$, we expect an average charge of \$11,763, with a 90% prediction interval of $[\$6,871, \$16,656]$.