1. The attached [wages.xlsx](https://canvas.hamline.edu/courses/19717/files/1641543/download?wrap=1)[Download wages.xlsx](https://canvas.hamline.edu/courses/19717/files/1641543/download?download_frd=1) dataset contains data on the hourly wage, age, and education of 80 workers at a single manufacturing firm. You are interested in whether age has a quadratic effect on predicted wages.

1. Plot Wage against Age and evaluate whether a linear or quadratic model would better capture the relationship.

***Looking at the plot, looks like the quadratic model captures the relationship between wage and age the best, since it fits withing the line of best fit as well as being the closest to the points.***

1. Estimate a multiple regression model of Wage using Age and Education as independent (X) variables; assume a standard linear relationship between Wage and Age.
2. Estimate another multiple regression model of Wage using Age and Education as independent (X) variables; this time fit Age using a quadratic relationship. Verify your choice from part a. by comparing the distribution of residuals and the goodness of fit between the models in parts b and c.

***Looking at the residuals of the linear and quadratic models, we can see that with the linear model there is an average deviation of observed wages from the predicted values at 4.678. When looking at the quadratic model, the residual standard error is 3.123, showing a tighter fir compared to the linear model. This is also demonstrated on the coefficients when looking at the p values which were all statistically significant for the quadratic model. In the linear model the only coefficient that was statistically significant was education. This backs up my choice of choosing the quadratic model.***

1. Use the appropriate model to predict hourly wages for someone with 16 years of education and age equal 30, 50, or 70.

***Using the line of code above, we can see that the predicted hourly wage for someone with 16 years of education and at age 30 is predicted to earn $25.85/hr, at age 50 is predicted to earn $31.54/hr, and at age 70 they are predicted to earn $26.56/hr.***

1. According to the model, at what age will someone with 16 years of education attain the highest wages?

***Using the model, we can see that at age 50 someone will earn 31.54/hr, which is the highest attainable wage for someone with 16 years of education.***

2. The [AnnArbor.xlsx](https://canvas.hamline.edu/courses/19717/files/1641542/download?wrap=1)[Download AnnArbor.xlsx](https://canvas.hamline.edu/courses/19717/files/1641542/download?download_frd=1)file contains data on a portion of the rental market in Ann Arbor, MI. The data includes the monthly rent, number of bedrooms, number of bathrooms, and the square footage of 40 rental properties.

1. Plot Rent against each of the three predictor variables and evaluate whether the relationship is best captured by a line or a curve. Identify variables that may benefit from a log-transformation.

***The code that may benefit from a log-transformation is SqFt, since the relationship between Rent and SqFt is best captured by a curve.***

1. Estimate a multiple regression model (with any appropriate log-transformations) to predict rent for a 1,600-square-foot rental with 3 bedrooms and 2 bathrooms.

***The predicted rent for a 1,600-square-foot rental with 3 bedrooms and 2 bathrooms is $1491.69.***