Lab 8 Activity

For this lab activity we will be using the `Anscombe` data (Anscombe, 1981) from the `carData` package. This Data contains `51 rows` and `4 columns` and it details Per-capita expenditures in education for each US state in 1970. Each row is named according to a state.

Variable	Description
education	Per-capita education expenditures, dollars
income	Per-capita income, dollars
young	Proportion under 18, per 1000
urban	Proportion urban, per 1000

run the following code to name the data you will be using as `dat`:

```
library(car)
dat <- Anscombe
```

1. Center the `young` variable and create a column to represent a quadratic term for the centered `young` variable.

2. Run a quadratic regression prediction `education` with the centered `young` variable and its quadratic version. Is the quadratic term, b_2 significantly different from 0? Given the sign of the quadratic term, should the regression line be concave or convex?

3. Find the the turning point of the quadratic line. Then compute a 95% bootstrapped confidence interval for it.

- Plot the density of all the bootstrapped turning points. Do you notice anything strange?

4. You should notice that something a bit strange is happening when we bootstrap our quadratic regression. Plot you quadratic regression. Does anything stand out to you? After looking at the plot, do you see any potential problems with our quadratic regression?

5. Find what state is causing the issue, remove it from the data, and run the quadratic regression again. what happens to the results? (**HINT:** the `which.max()` function will be helpful for this task.)

- visualize the quadratic regression after removing the problematic state. What do you observe?