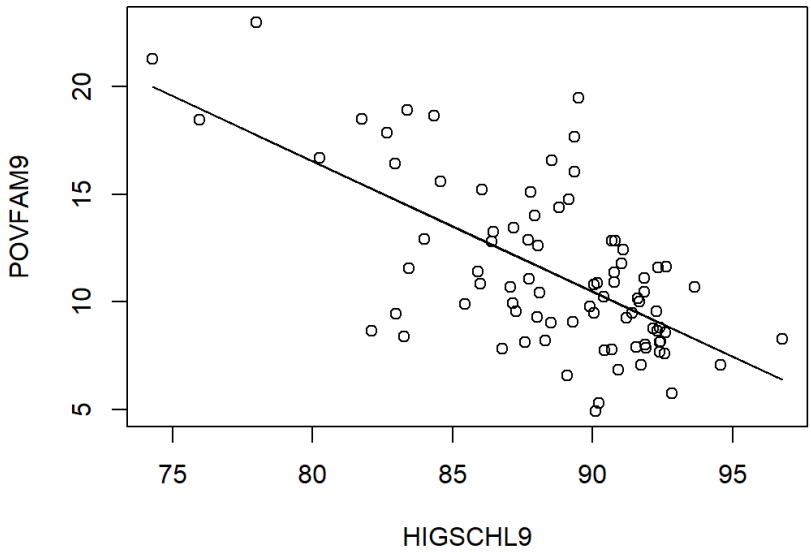
Assignment 1



The scatterplot shows that places with higher high-school graduation rates usually have lower poverty. The dots move downward as graduation rates go up. The line also slopes downward. This tells us that when education increases, poverty tends to decrease.

2. Regression results

Intercept is about 65.0. Slope for HIGSCHL9 is about –0.61. R^2 is about 0.42. F value is 58.97 with a very small p-value

3. t-value and p-value for HIGSCHL9

HIGSCHL9 has a big t-value (around –7.68) and a very tiny p-value. This means the variable is important. In other words, high-school graduation is strongly related to poverty and is not random.

4. R-square interpretation

R^2 is about 0.42. This means around forty percent of the differences in poverty can be explained by differences in high-school graduation rates. For real-world data, this is a decent amount.

5. F-value interpretation

The F-value is high, and the p-value is extremely small. This means the overall model works well and the relationship is meaningful.

6. Regression equation and slope meaning

Equation:

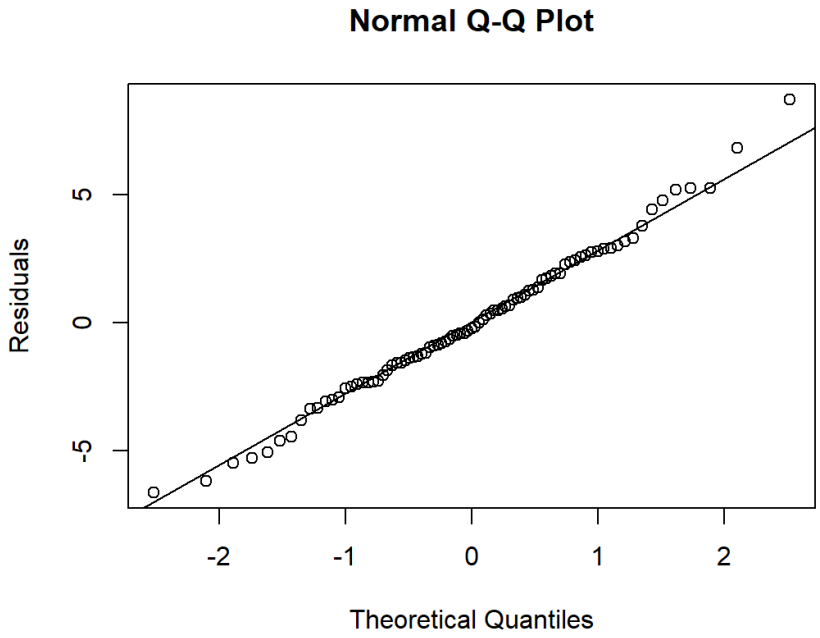
POVFAM9 = 65.01322 − 0.60605 × HIGSCHL9

Slope meaning:
For every one-percent increase in people who have a high-school diploma, poverty goes down by a little more than half a percent.

7. Prediction when HIGSCHL9 = 70%

Plugging 70 into the equation gives about 22.6.
So, if 70 percent of people have a high-school diploma, the predicted poverty rate is about twenty-two percent.

Assignment 2



2. Normality interpretation

Most points follow the straight line closely. A few points at the ends curve a little, but overall, the pattern looks normal enough. This means the normality assumption is mostly okay for this model.

Assignment 3

Multiple regression results

- Intercept: 53.49
- HIGSCHL9 slope: –0.54350
- FEHEAD9 slope: 0.42085
- R^2: about 0.51

2. Interpretation of FEHEAD9

FEHEAD9 is the percent of female-headed families. The positive number means that when this percent goes up, poverty also goes up. So, areas with more female-headed households tend to have higher poverty levels.

3. Comparing the two models

The first model explained about 42 percent poverty. The new model explains about 51 percent.
Both variables are significant, and the model improves overall. Adding FEHEAD9 makes the model stronger.

4. Should FEHEAD9 stay in the model

Yes. FEHEAD9 clearly helps explain poverty better. It is significant and improves the model, so it makes sense to keep it.