

Chapter 5: Least-Squares Regression

The data set used in this example was assembled thanks to data provided by the U.S. Environmental Protection Agency. This data set contains information for 82 automobiles: make, model, cubic feet of cab space, engine horsepower, average miles per gallon, top speed, and vehicle weight (in pounds). We will investigate the relationship between average miles per gallon (MPG) and vehicle weight (Weight).

Descriptive Statistics: Weight, MPG

Variable	N	Mean	Median	TrMean	StDev	SE Mean
Weight	82	3091.5	3000.0	3064.2	814.1	89.9
MPG	82	33.78	32.45	33.37	10.00	1.10

Variable	Minimum	Maximum	Q1	Q3
Weight	1750.0	5500.0	2500.0	3625.0
MPG	13.20	65.40	27.18	39.38

Correlations: Weight, MPG

Pearson correlation of Weight and MPG = -0.905

First, calculate the slope:

Second, calculate the intercept:

The equation of the least-squares regression line is:

How many miles per gallon would you predict a car with a weight of 2500 pounds would get?

What is the value of r^2 ? Interpret this value.

The Honda Civic used in this study had a weight of 2500 pounds and got 38.4 miles per gallon. Calculate and interpret the residual for this observation.