1. Use the lm() function to perform a simple linear regression with the response **mpg** and the predictor **hp**.

Logo

Description automatically generated with low confidence

1. Is there a relationship between the target **mpg** and predator **hp**?

Text, letter

Description automatically generated

There is a relationship between mpg and hp, the p-value is under 5%.

1. How strong is the relationship between the response and predictor?

The R-squared value is .6006 so there is a decent but not strong relationship between the two. See #2 screenshot.

1. Is the relationship between **mpg** and **hp** positive or negative?

The relationship between mpg and hp is negative. The estimate for our predictor hp is negative, -.064548. See #2 screenshot.

1. What is the predicted **mpg** associated with a horsepower (hp) of 100? What’s the 95% confidence interval for the predicted **mpg**?

A picture containing graphical user interface

Description automatically generated

The predicted mpg with 100 hp is 22.84316. The confidence interval ranges from 21.5729 to 24.15844.

1. Plot the response and the predictor and add the regression line using abline().

Text

Description automatically generated with low confidence

Chart, scatter chart

Description automatically generated

1. Perform a multiple linear regression with mpg as the response and the predictors **cyl**, **disp**, **hp**, **wt**, **vs**, and **gear**. Print out the results using summary() function.

Table

Description automatically generated

1. Is there a relationship between the predictors and the response?

Yes there is, the p-value is under 5%. It is almost zero. See screenshot #7.

1. Which predictors appears to have a statistically significant relationship to the response?

The predictors wt and hp both has statistically significant relationships with the response. They are the only ones under 5%. See screenshot #7.

1. Use \* symbols to fit linear regression models with interaction effects between hp and wt. Does this interaction appear to be statistically significant?

Text

Description automatically generated

The interaction is statistically significant, the p-value is well under 5%.