Scatter Plot and Correlation Coefficient

We selected Q4.1.26 (p.188) as an example of using StatCrunch to construct a scatter plot and to calculate the correlation coefficient of a paired data set.

Q4.1.26
Credit Scores  Your Fair Isaacs Corporation (FICO) credit score is used to determine your creditworthiness. It is used to help determine whether you qualify for a mortgage or credit and is even used to determine insurance rates. FICO scores have a range of 300 to 850, with a higher score indicating a better credit history. The given data represent the interest rate (in percent) a bank would offer on a 36-month auto loan for various FICO scores.

<table>
<thead>
<tr>
<th>Credit Score</th>
<th>Interest Rate (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>545</td>
<td>18.982</td>
</tr>
<tr>
<td>595</td>
<td>17.967</td>
</tr>
<tr>
<td>640</td>
<td>12.218</td>
</tr>
<tr>
<td>675</td>
<td>8.612</td>
</tr>
<tr>
<td>705</td>
<td>6.680</td>
</tr>
<tr>
<td>750</td>
<td>5.150</td>
</tr>
</tbody>
</table>

Source: www.myfico.com

(a) Which variable do you believe is likely the explanatory variable and which is the response variable?
(b) Draw a scatter diagram of the data.
(c) Determine the linear correlation coefficient between FICO score and interest rate on a 36-month auto loan.
(d) Does a linear relation exist between the FICO score and interest rate?

(a) Which variable do you believe is likely the explanatory variable and which is the response variable?

Since the interest rate obtained for an auto loan is based on a person's credit score, credit score is an explanatory variable and interest rate is a response variable.

(b) Draw a scatter diagram of the data.

Step 1: 1) Download the data set.
2) Click Graph → Scatter Plot.
Step 2: 1) Choose **Credit Score** under *X column*: and **Interest Rate (percent)** under *Y column*:

2) Click **Points** under **Display**:

3) Under **Graph Properties**: -> enter **Credit Score** for *X-axis label*, **Interest Rate (percent)** for *Y-axis label*, and **Credit Score vs Interest Rate** for Title.

4) Click **Compute**!

StatCrunch output of the scatter plot is shown on the right.
(c) Determine the linear correlation coefficient between FICO score and interest rate on a 36-month auto loan.

Step 1: Click **Stat \(\rightarrow\)** Summary Stats \(\rightarrow\) Correlation.

Step 2: 1) Under **Select Column(s):** \(\rightarrow\) click Credit Score and Interest Rate (percent).
   (Click each item while holding the Ctrl key on the keyboard)
2) Click **Compute!**
The linear correlation coefficient is computed and shown below.

(d) Does a linear relation exist between the FICO score and interest rate?

From Table II in Appendix A, \( r \) critical value with \( n = 6 \) is 0.811.
Since \( |r| = 0.976 \) which is greater than \( r \) critical value, there is a negative linear correlation between the FICO score and interest rate. As the FICO score decreases, the interest rate increases.