1.5 Scatterplots and Curve Fitting

Distribution of Wakefulness
(Sorted by Wake-Up Time and Hours Up)

How to read this chart:
Woke up around 8:30am and stayed up 3 hours

Start of Awake Period

Title: CA_Template (1 of 8)
positive correlation: positive slope of linear pattern

Figure 1
Two-Hour vs Four-Hour Speed Scatterplot
MTC Year 2020 AM Peak Period Forecast

$y = 0.8857x + 6.594$
negative correlation: negative slope of linear pattern
Another example of negative correlation

Grade

Beers Drank

r = -.74
1) how to make a scatterplot (or scatter diagram)
2) how judge if there is any linear patter (correlation)
3) tell if there is positive or negative correlation
4) find the equation of the linear pattern

we did these things a) manually, and b) using Microsoft Excel

1) how to make a scatterplot (or scatter diagram)
given a set of ordered pairs as we see on the left, make a
two axis grid with appropriate scale, and plot the points
If there does appear to be a linear pattern (and in this case the points are quite scattered), try to sketch a line which cuts through the center of the data, and goes through two of the points on the graph. You can then determine the equation using the coordinates of the two points that your line goes through. This is done below:

\[
\begin{align*}
(18, 20) \; \text{and} \; (35, 40) \\
\end{align*}
\]

\[
\begin{align*}
m &= \frac{y_2 - y_1}{x_2 - x_1} \\
   &= \frac{40 - 20}{35 - 18} \\
   &= \frac{20}{17} \\

b &= y - mx \\
   &= 20 - \frac{20}{17} \cdot 18 \\
   &= -\frac{20}{17}
\end{align*}
\]

\[\therefore y = \frac{20}{17} x - \frac{20}{17}\]
I did a demonstration of how to do this same problem with Excel

There is a link in D2L with a short demonstration movie of how to do this.
ASSIGNMENT: #13, #17