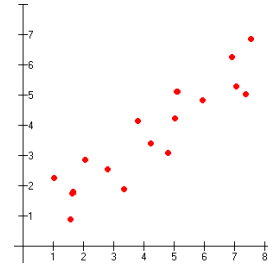# Section 1.7: Exploring Data - Linear Models and Scatter Plots

Scatter Plots and Correlation:

Scatter Plot: a graph that shows the relationship between two variables by plotting ordered pairs.
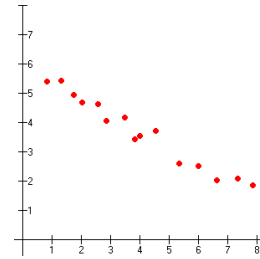
Positive Correlation: *y* tends to increase as *x* increases – an increase in one variable causes the other variable to increase as well.
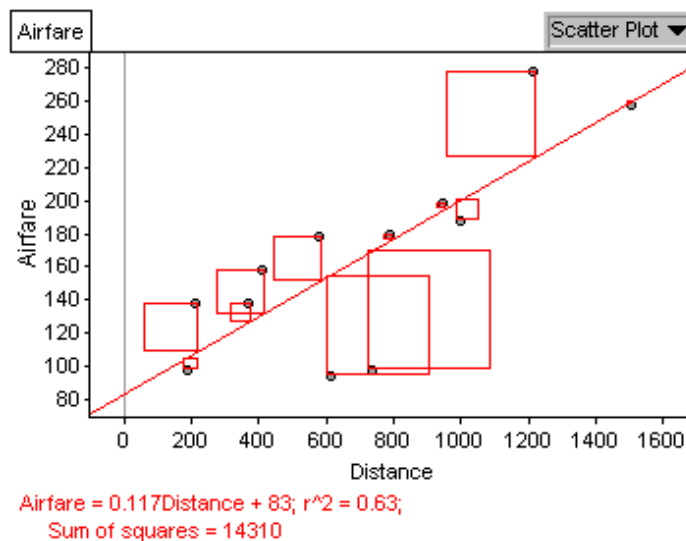
    Example: Year and world population

Negative Correlation: *y* tends to decrease as *x* increases – an increase in one variable causes the other variable to decrease.

    Example: Weight of a car and gas mileage

Regression Line: a line of best fit or least-squares line

Airfare = 0.117Distance + 83; r^2 = 0.63;
Sum of squares = 14310

Linear Correlation Coefficient: This value gives a measure of how well the model fits the data. It is only used for linear functions and is denoted by r.

- $|r| \leq 1$, that is $-1 \leq r \leq 1$
- A positive value for r indicates a positive correlation.
- A negative value for r indicates a negative correlation.
- A low value for r (which is a value close to zero either positive or negative) doesn't mean that there is no correlation, just that there isn't a strong linear correlation.

As x increases, y tends to decrease.

Negative Linear Correlation

As x increases, y tends to increase.

Positive Linear Correlation

No Correlation

Nonlinear Correlation