Linear Regression/Correlation

Correlation Coefficient (r or R): a number that shows the strength and type of relationship between two variables

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{\left[n(\Sigma x^2) - (\Sigma x)^2\right]\left[n(\Sigma y^2) - (\Sigma y)^2\right]}}$$

$-1 \le r \le 1$

The equation for the line of best fit or the "least squares" regression line is given by $y' = a + bx$, where

$$a = \frac{(\Sigma y)(\Sigma x^2) - (\Sigma x)(\Sigma xy)}{n(\Sigma x^2) - (\Sigma x)^2} \qquad b = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{n(\Sigma x^2) - (\Sigma x)^2}$$

The coefficient of determination is given by

$$r^2 = \frac{\text{explained variation}}{\text{total variation}}$$