Coefficients in Matrix Form:

$$\begin{bmatrix} \sum_{i=1}^{n} y_i \\ \sum_{i=1}^{n} x_i y_i \end{bmatrix} = \begin{bmatrix} n & \sum_{i=1}^{n} x_i \\ \sum_{i=1}^{n} x_i & \sum_{i=1}^{n} x_i^2 \end{bmatrix} \begin{bmatrix} A \\ B \end{bmatrix}$$

(This form adapted from Lecture 4 Notes)

Direct Solutions for Coefficients:

$$A = \frac{\sum_{i=1}^{n} x_i^2 \sum_{i=1}^{n} y_i - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} x_i y_i}{\Delta}$$

$$B = \frac{n \sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{\Delta}$$

$$\Delta = n \sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i \right)^2$$

(These equations are adapted from Taylor 8.10-8.12)

These equations solve for a Maximum Likelihood fit in the form of $y = A + Bx$, with n representing the total number of measured (x_i, y_i) data points.