$$E = \sum_{i=1}^{\infty} [y_i - f(x_i)]^2$$

Here $f(x_i) = ax_i^2 + bx_i + c = 0$

$$\therefore E = \sum_{i=1}^{\infty} [y_i - (ax_i^2 + bx_i + c)]^2$$

or $$E = \sum_{i=1}^{\infty} [y_i - ax_i^2 - bx_i - c]^2$$

Now, $$\frac{\partial E}{\partial a} = 2 \sum [y_i - ax_i^2 - bx_i - c](-x_i^2) = 0.$$

$$\Rightarrow \sum y_i(-x_i)^2 + \sum a(x_i)^4 + b\sum(x_i)^3 + c\sum(x_i)^2 = 0$$

$$\Rightarrow \boxed{a\sum(x_i)^4 + b\sum(x_i)^3 + c\sum(x_i)^2 = +\sum y_i(x_i)^2}$$

And $$\frac{\partial E}{\partial b} = 2\sum[y_i - ax_i^2 - bx_i - c](-x_i) = 0$$

$$\Rightarrow -\sum y_i(x_i) + a\sum(x_i)^3 + b\sum(x_i)^2 + c\sum x_i = 0$$

$$\Rightarrow \boxed{a\sum(x_i)^3 + b\sum(x_i)^2 + c\sum x_i = \sum y_i x_i.}$$

And $$\frac{\partial E}{\partial c} = 2\sum [y_i - ax_i^2 - bx_i - c](-1) = 0$$

$$\Rightarrow -\sum y_i + a\sum x_i^2 + b\sum x_i + c\sum 1 = 0$$

$$\Rightarrow \boxed{a\sum(x_i)^2 + b\sum x_i + cN = \sum y_i}$$

The matrix is as follows -

$$\begin{pmatrix} \sum(x_i)^4 & \sum(x_i)^3 & \sum(x_i)^2 \\ \sum(x_i)^3 & \sum(x_i)^2 & \sum x_i \\ \sum(x_i)^2 & \sum x_i & \sum n \end{pmatrix} \begin{pmatrix} a \\ b \\ c \end{pmatrix} = \begin{pmatrix} \sum y_i(x_i)^2 \\ \sum y_i x_i \\ \sum y_i \end{pmatrix}$$

$$\Rightarrow \begin{pmatrix} a \\ b \\ c \end{pmatrix} = \begin{pmatrix} \sum x_i^4 & \sum x_i^3 & \sum x_i^2 \\ \sum x_i^3 & \sum x_i^2 & \sum x_i \\ \sum x_i^2 & \sum x_i & N \end{pmatrix}^{-1} \begin{pmatrix} \sum y_i (x_i)^2 \\ \sum (y_i x_i) \\ \sum y_i \end{pmatrix}$$

$$\Rightarrow \begin{pmatrix} a \\ b \\ c \end{pmatrix} = \begin{pmatrix} X_a & X_b & X_c \\ X_b & X_c & X \\ X_c & X & N \end{pmatrix}^{-1} \begin{pmatrix} Y_a \\ Y_b \\ Y \end{pmatrix}$$