$$D\chi^2(a_0,a_1) = \left[\frac{\partial \chi^2}{\partial a_0}, \frac{\partial \chi^2}{\partial a_1}\right]$$

$$= \left[2\sum_{i=1}^{n}(y_i-(a_0+a_1x_i))(-1), 2\sum_{i=1}^{n}(y_i-(a_0+a_1x_i))(-x_i)\right] = [0,0]$$

$$\Rightarrow -2\sum_{i=1}^{n} y_i - a_0 - a_1 x_i = 0 \quad ; \quad -2\sum_{i=1}^{n} y_i x_i - a_0 x_i - a_1 x_i^2 = 0$$

$$\sum_{i=1}^{n} y_i - a_0 n - \sum_{i=1}^{n} a_1 x_i = 0$$

$$\boxed{a_0 = \frac{1}{n}\sum_{i=1}^{n} y_i - \frac{a_1}{n}\sum_{i=1}^{n} x_i = \bar{y} - a_1\bar{x}}$$

$$\sum_{i=1}^{n} y_i x_i - a_0\sum_{i=1}^{n} x_i - a_1\sum_{i=1}^{n} x_i^2 = 0$$

$$a_1\sum_{i=1}^{n} x_i^2 = \sum_{i=1}^{n} y_i x_i + \left[\frac{-1}{n}\sum_{i=1}^{n} y_i + a_1\left(\frac{1}{n}\sum_{i=1}^{n} x_i\right)\right]\left(\sum_{i=1}^{n} x_i\right)$$

$$a_1\left[\left(\sum_{i=1}^{n} x_i^2\right) - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2\right] = \sum_{i=1}^{n} y_i x_i - \frac{1}{n}\left(\sum_{i=1}^{n} y_i\right)\left(\sum_{i=1}^{n} x_i\right)$$

$$\boxed{a_1 = \frac{\sum_{i=1}^{n} y_i x_i - \frac{1}{n}\left(\sum_{i=1}^{n} y_i\right)\left(\sum_{i=1}^{n} x_i\right)}{\sum_{i=1}^{n} x_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2}}$$

$$D\chi^2(a_0,a_1,a_2)=\left[\frac{\partial\chi^2}{\partial a_0},\frac{\partial\chi^2}{\partial a_1},\frac{\partial\chi^2}{\partial a_2}\right]=[0,0,0]$$

$$=\left[-2\sum_{i=1}^{n}(y_i-a_0-a_1x_i-a_1x_i^2),\ -2\sum_{i=1}^{n}(y_i-a_0-a_1x_i-a_2x_i^2)x_i\right.$$
$$\left.,\ -2\sum_{i=1}^{n}(y_i-a_0-a_1x_i-a_2x_i^2)(x_i^2)\right]=[0,0,0]$$

$$-2\left(\sum_{i=1}^{n}y_i-a_0-a_1x_i-a_2x_i^2\right)=0$$

$$-2\left(\sum_{i=1}^{n}y_ix_i-a_0x_i-a_1x_i^2-a_2x_i^3\right)=0$$

$$-2\left(\sum_{i=1}^{n}y_ix_i^2-a_0x_i^2-a_1x_i^3-a_2x_i^4\right)=0$$

$$\begin{cases}\sum_{i=1}^{n}y_i=\sum_{i=1}^{n}a_0+a_1x_i+a_2x_i^2\\ \sum_{i=1}^{n}y_ix_i=\sum_{i=1}^{n}a_0x_i+a_1x_i^2+a_2x_i^3\\ \sum_{i=1}^{n}y_ix_i^2=\sum_{i=1}^{n}a_0x_i^2+a_1x_i^3+a_2x_i^4\end{cases}$$