$$= a^{2} \sum_{i=1}^{N} x_{i}^{2} + Nb^{2} + \sum_{i=1}^{N} y_{i}^{2} + 2ab \sum_{i=1}^{N} x_{i} - 2b \sum_{i=1}^{N} y_{i} - 2a \sum_{i=1}^{N} x_{i} y_{i}$$