

In order to help understand how to formulate the quadratic part of the problem, try doing this matrix multiplication:

$$(x_1 \quad x_2 \quad x_3) \begin{pmatrix} \beta & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$$

If you formulate the problem as a QP you only need a single quadratic objective matrix term. If you formulate it as a QCP you will need 2 quadratic constraints for each data point. So, if there are 50 data points, you will need 100 quadratic constraints. This just tells you how to do the quadratic part, there is still a linear part you'll need to figure out.