$$SSQR = e^T \cdot e = (y - Xb)^T \cdot (y - Xb)$$

with $e = y - Xb$

$$= y^T y - y^T X b - b^T X^T y + b^T X^T X b$$

- Least-Squares means, find values of vector b such that SSQR is minimal
- This is done by taking the "gradient" of SSQR with respect to the vector b:

$$\nabla SSQR = \begin{bmatrix} \partial SSQR / \partial b_0 \\ \partial SSQR / \partial b_1 \\ \vdots \\ \partial SSQR / \partial b_k \end{bmatrix}$$

- $\frac{\partial SSQR}{\partial b} = 0 - y^T X - y^T X + 2 b^T X^T X$

$$= -2 y^T X + 2 b^T X^T X$$

- Find $\hat{b}$ → $0 = -2 y^T X + 2 \hat{b}^T X^T X$