

$$\frac{\partial J(m, b)}{\partial m} = \frac{1}{n} \sum_{i=1}^n (y_i - mx_i + b)^2$$

$$= \frac{1}{n} \sum_{i=1}^n \frac{d}{dm} (y_i - mx_i + b)^2$$

$$= \frac{1}{n} \sum_{i=1}^n 2(y_i - mx_i + b)(-x_i)$$

$$= \frac{1}{n} \sum_{i=1}^n (-2x_i)(y_i - mx_i + b)$$

$$\frac{\partial J(m, b)}{\partial b} = \frac{1}{n} \sum_{i=1}^n (y_i - mx_i + b)^2$$

$$= \frac{1}{n} \sum_{i=1}^n \frac{d}{db} (y_i - mx_i + b)^2$$

$$= \frac{1}{n} \sum_{i=1}^n 2(y_i - mx_i + b)(1)$$

$$= \frac{1}{n} \sum_{i=1}^n 2(y_i - mx_i + b)$$