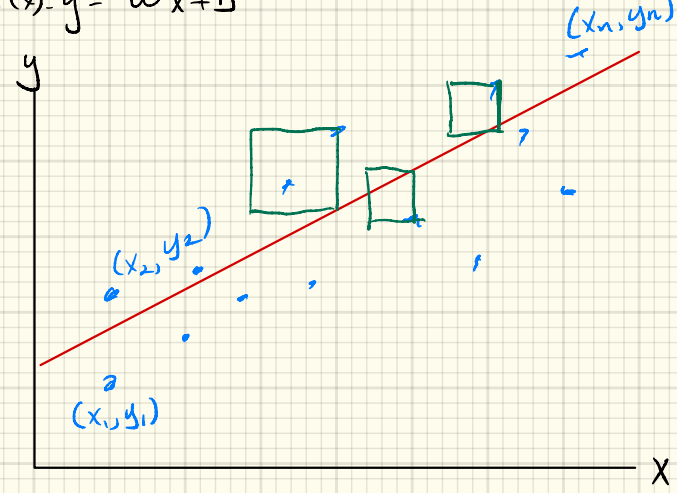
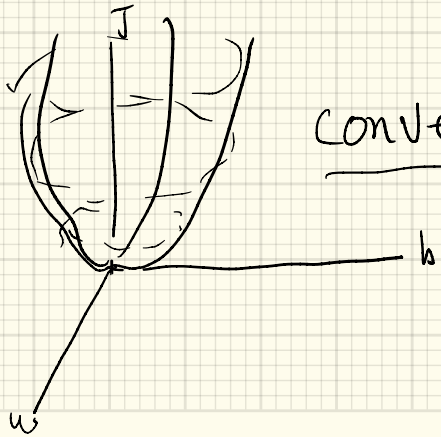
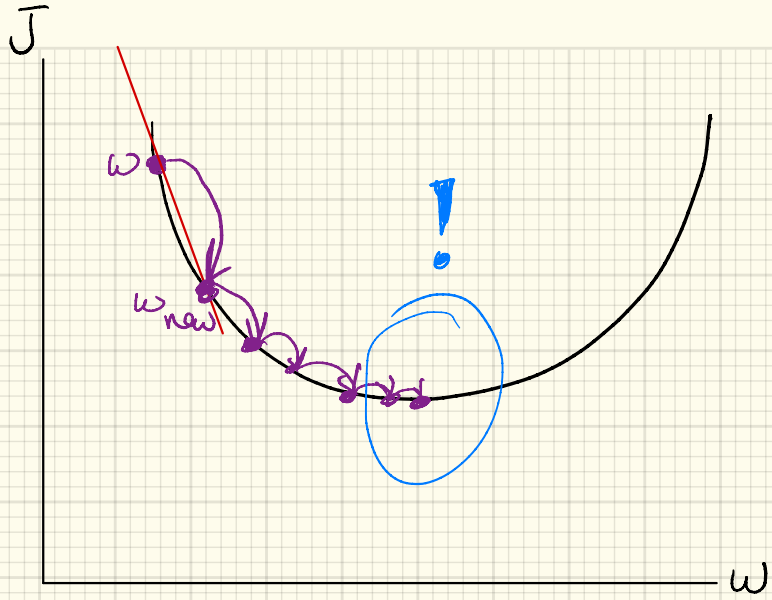
$f(x) = \hat{y} = wx + b$



SSE
RSS $= (y^1 - \hat{y}^1)^2 + (y_2 - \hat{y}_2)^2 + \cdots + (y_n - \hat{y}_n)^2$
Cost
Loss
$J(w,b) = (y^1 - (wx^1 + b))^2 + \cdots + (y_n - (wx_n + b))^2$

$\approx (\quad) w^2 + (\quad) b^2 + (\,) w$
$+ (\,) b$
$+ (\,)$





$$w_{new} = w - \alpha \frac{\partial J}{\partial w}(w, b)$$

$$b_{new} = b - \alpha \frac{\partial J}{\partial b}(w, b)$$

$$\frac{\partial J}{\partial w}(w,b) = 2(y_1 - (wx_1 + b))\,x_1 + 2(y_2 - (wx_2 + b))\,x_2 + \cdots$$

$$\frac{\partial J}{\partial b}(w,b) = 2(y_1 - (wx_1 + b)) + 2(y_2 - (wx_2 + b)) + \cdots$$

$$\hat{y} = w_1 x_1 + w_2 x_2 + \cdots + w_m x_m + b$$

m features

$$= \vec{w} \cdot \vec{x} + b$$ yay vectors!

n examples

$$J(\vec{w}, b) = (\hat{y}^1 - y^1)^2 + \cdots + (\hat{y}^n - y^n)^2$$

$$= (\hat{y}^1 - (\vec{w} \cdot \vec{x}^1 + b))^2 + \cdots + (\hat{y}^n - (\vec{w} \cdot \vec{x}^n + b))^2$$

$$w_{i\,new} = w_i - \alpha \frac{\partial J}{\partial w_i}(\vec{w}, b)$$

etc.