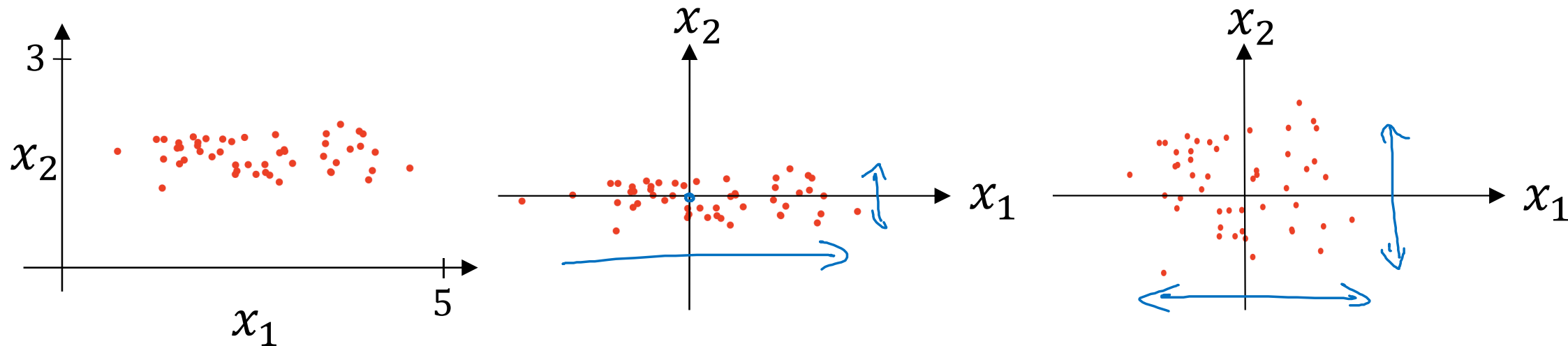Setting up your
optimization problem

Normalizing inputs

deeplearning.ai

Normalizing training sets

$x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$

Substract mean:

$\boxed{\mu} = \frac{1}{m} \sum_{i=1}^{m} x^{(i)}$

$\boxed{x := x - \mu}$

Normalize variance

$\boxed{\sigma^2} = \frac{1}{m} \sum_{i=1}^{m} x^{(i)} **2$

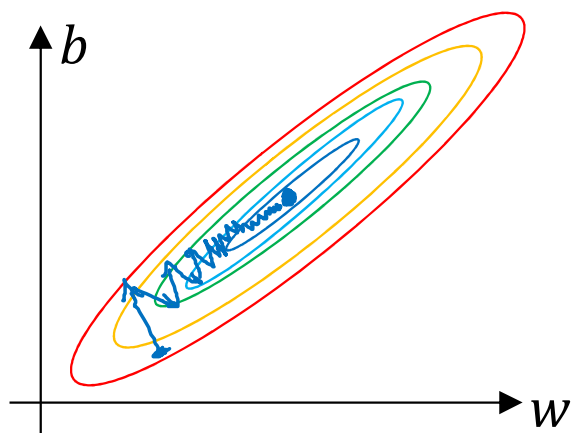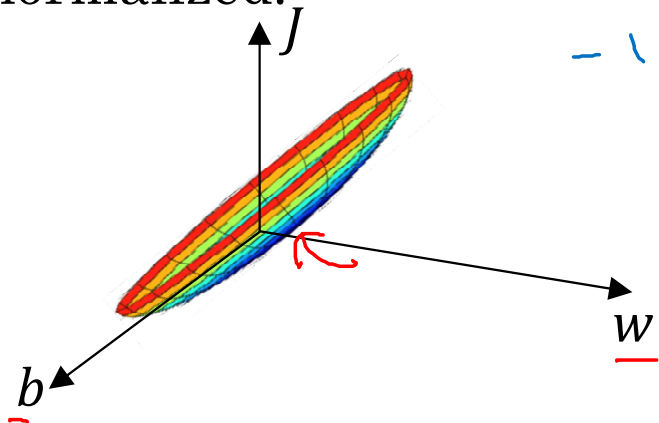$\hookleftarrow$ element-wise

$\boxed{x /= \sigma^2}$

Use same μ σ^2 to normalize test set.

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Why normalize inputs?

$$J(w, b) = \frac{1}{m} \sum_{i=1}^{m} \mathcal{L}\left(\hat{y}^{(i)}, y^{(i)}\right)$$

$\omega_1 \qquad x_1: \underline{1 \cdots 1000} \leftarrow$

$\omega^2 \qquad x_2: \underline{0 \cdots 1} \leftarrow$

$-1 \cdots 1$

Unnormalized:

$\underline{w}$

$\underline{b}$

Normalized:

$x_1: 0 \cdots 1$

$x_2: -1 \cdots 1$

$x_3: 1 \cdots 2$

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