

$$h_{\theta}(x^{(i)}) = \theta_0 + \theta_1 x^{(i)}$$

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$$J(\theta) = \frac{1}{2m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)})^2 = \frac{1}{2m} \sum_{i=1}^m (\theta_0 + \theta_1 x^{(i)} - y^{(i)})^2$$

Goal 22712

$$\textcircled{1} \quad \frac{\partial J}{\partial \theta_0} = \frac{1}{m} \sum_{i=1}^m (\theta_0 + \theta_1 x^{(i)} - y^{(i)}) \cdot 1$$

$$\textcircled{2} \quad \frac{\partial J}{\partial \theta_1} = \frac{1}{m} \sum_{i=1}^m (\theta_0 + \theta_1 x^{(i)} - y^{(i)}) \cdot x^{(i)}$$

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$$\textcircled{1} \Rightarrow \theta_0 + \theta_1 x - y = 0 \Rightarrow \theta_0 = y - \theta_1 x$$

$$\textcircled{2} \Rightarrow (\theta_0 + \theta_1 x - y) x = 0 \Rightarrow \theta_1 = \frac{(y - \theta_0) x}{x^2}$$

$$\theta_0 = \frac{1}{m} \sum_{i=1}^m y^{(i)} - \theta_1 x^{(i)}$$

Goal

$$\theta_1 = \frac{\sum_{i=1}^m (y^{(i)} - \theta_0) x^{(i)}}{\sum_{i=1}^m x^{(i)2}}$$