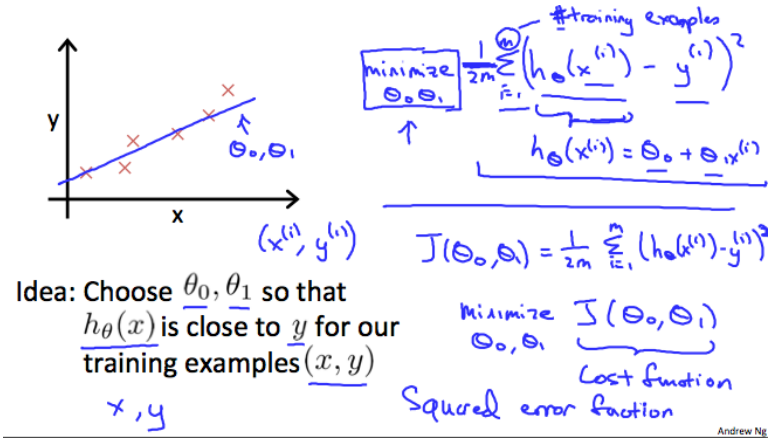
# Cost Function

We can measure the accuracy of our hypothesis function by using a **cost function**. This takes an average difference (actually a fancier version of an average) of all the results of the hypothesis with inputs from x's and the actual output y's.

$$J(\theta_0,\theta_1) = \frac{1}{2m}\sum_{i=1}^{m}(\hat{y}_i - y_i)^2 = \frac{1}{2m}\sum_{i=1}^{m}(h_\theta(x_i) - y_i)^2$$

To break it apart, it is $\frac{1}{2}\bar{x}$ ~~where $\bar{x}$ is the mean of the squares of~~ $h_\theta(x_i) - y_i$ , or the difference between the predicted value and the actual value.

This function is otherwise called the "Squared error function", or "Mean squared error". The mean is halved $\left(\frac{1}{2}\right)$ ~~as a convenience for the~~ computation of the gradient descent, as the derivative term of the square function will cancel out the $\frac{1}{2}$ ~~term. The following image~~ summarizes what the cost function does:

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