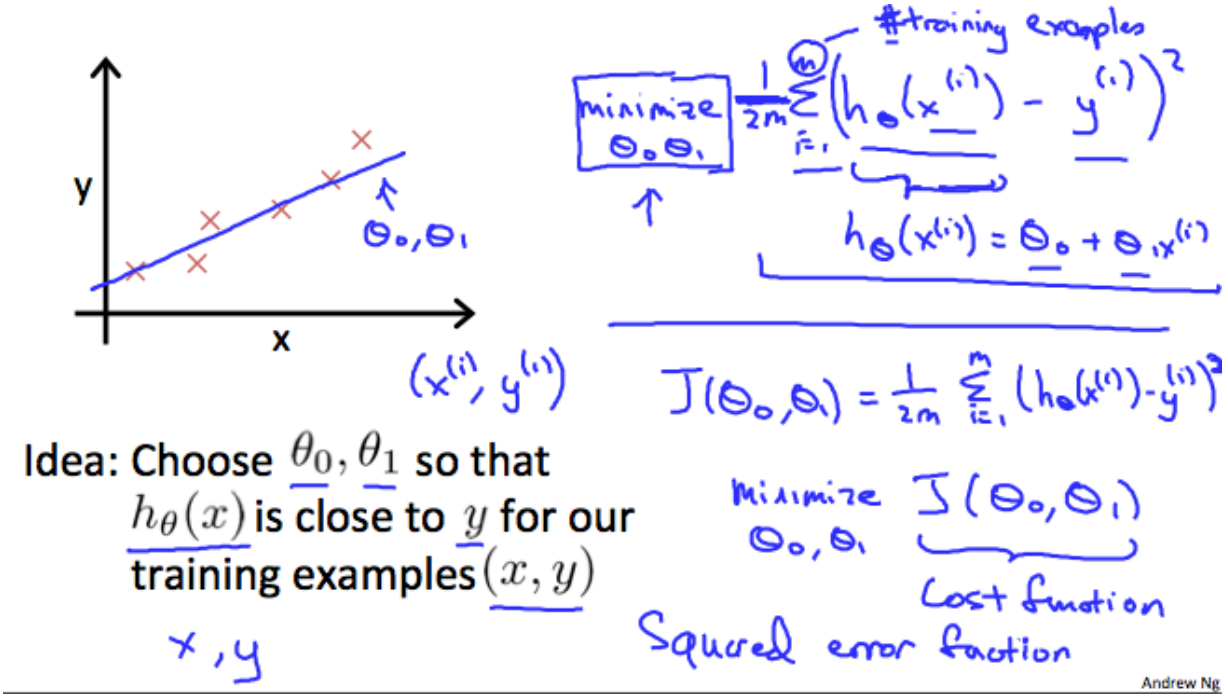
Cost Function

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) = \dfrac {1}{2m} \displaystyle \sum _{i=1}^m \left (\hat{y}_{i}- y_{i} \right)^2 = \dfrac {1}{2m} \displaystyle \sum _{i=1}^m \left (h_\theta (x_{i}) - y_{i} \right)^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 ($\frac{1}{2}$) 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:



Complete