Problem 1

the possible equation is $h(x) = \theta_1 x + \theta_0$

$$J(\theta_0, \theta_1) = \sum_{i=1}^{n} \left(h(x^{n}) - y^{(n)} \right)^2$$

$$= \left(h(x^{(1)}) - y^{(1)}\right)^2 + \left(h(x^{(2)}) - y^{(2)}\right)^2 + \left(h(x^{(3)}) - y^{(3)}\right)^2$$

$$+ \left(h(x^{(4)}) - y^{(4)}\right)^2 = (\theta_1 + \theta_0 - 1)^2 + (2\theta_1 + \theta_0 - 2)^2$$

$$+ (3\theta_1 + \theta_0 - 1)^2 + (5\theta_1 + \theta_0 - 3)^2$$

$$= 39\theta_1^2 + 4\theta_0^2 + 22\theta_0\theta_1 - 46\theta_1 - 14\theta_0$$

$$+ 15$$

$$\frac{\partial J}{\partial \theta_0} = 8\theta_0 + 22\theta_1 - 14$$

$$\frac{\partial J}{\partial \theta_1} = 78\theta_1 + 22\theta_0 - 46$$

Base on the 100 time gradient descent

, the initial point is (0, 0). and α is

0.02

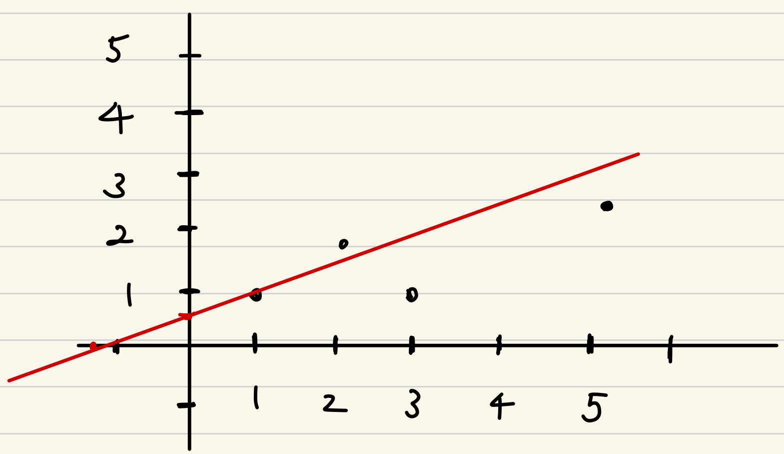
θ_0 seems to be converging 0.56

θ_1 seems to be convergingy 0.43

So the formula for the line that fit to

the given points will have to be

$$h(x) = 0.43x + 0.56$$



B. $J(\theta_1, \theta_0) = J(0, 0) = 15$