Problem 1

$$J(\theta_0, \theta_1) = \sum_{i=1}^{100} \left(h(x^{(i)}) - y^{(i)}\right)^2$$

$$\frac{J}{\partial\theta_0} = \sum_{i=1}^{100} 2\left(h(x^{(i)}) - y^{(i)}\right) = 2\left(h(x^{(1)}) - y^{(1)}\right) + 2\left(h(x^{(2)}) - y^{(2)}\right)$$

$$\cdots\cdots \quad 2\left(h(x^{(100)}) - y^{(100)}\right) \qquad x\theta_1 + \theta_0$$

$$\frac{J}{\partial\theta_1} = \sum_{i=1}^{100} 2\left(h(x^{(i)}) - y^{(i)}\right) \cdot x^{(i)} = 2\left(h(x^{(1)}) - y^{(1)}\right) \cdot x^{(1)}$$

$$+ 2\left(h(x^{(2)}) - y^{(2)}\right) \cdot x^{(2)} \cdots\cdots\cdots + 2\left(h(x^{(100)}) - y^{(100)}\right) \cdot x^{(100)}$$

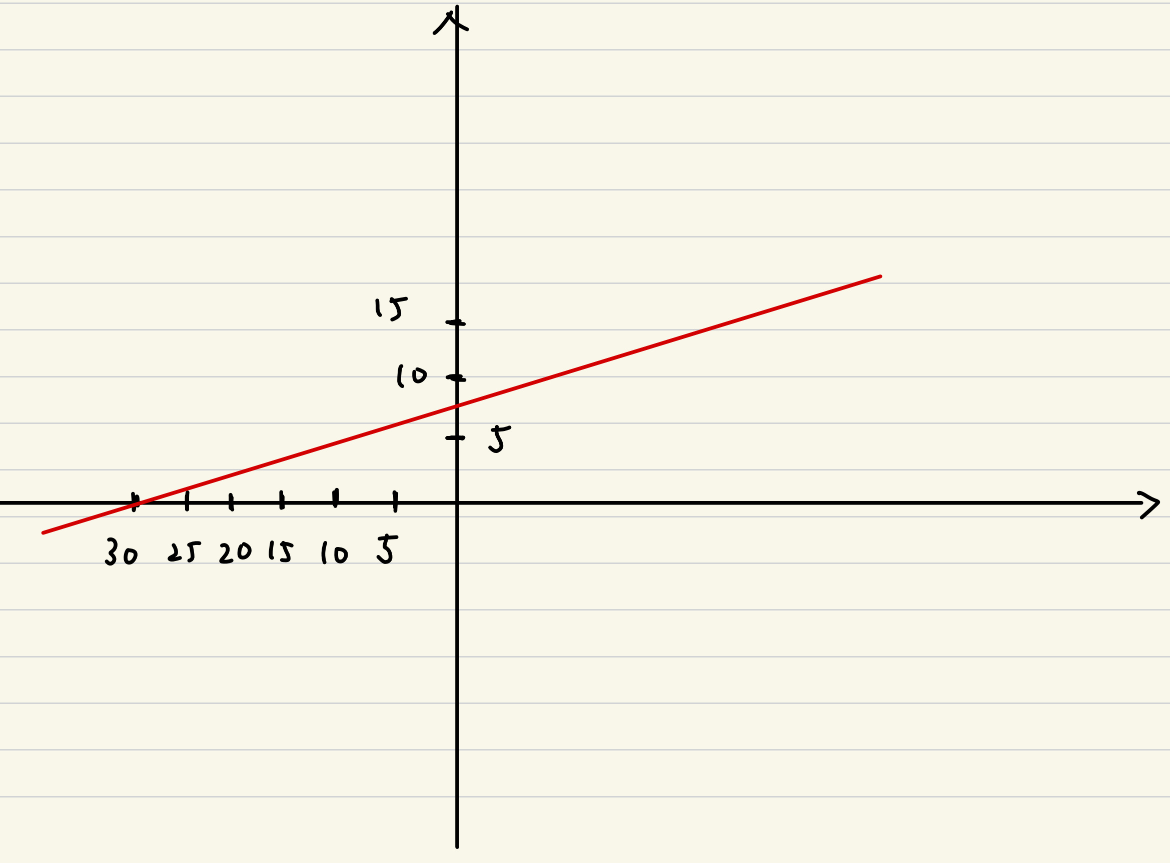
Base on the 300 time gradient descent, the initial point is (0, 0). and α is 0.00005

θ_0 seems to be converging 5.5647

θ_1 seems to be convergingy 0.1864

So the formula for the line that fit to the given points will have to be

$$h(x) = 0.1864\,x + 5.5647$$



b. $h(x) = \theta_1 x + \theta_0$

$$h(10) = \theta_1 \cdot 10 + \theta_1$$

$$= 0.1864 \cdot 10 + 5.5647$$

$$= 7.4287$$