1) ~~Given,~~

$$\Theta = (-\log(4), \log(2), -\log(3)),\ \Theta_0 = 0.$$

$$\quad \Theta_1 \qquad \Theta_2 \qquad \Theta_3$$

$$x = (1, 1, 1)$$

$$\quad x_1 \quad x_2 \quad x_3$$

We know that

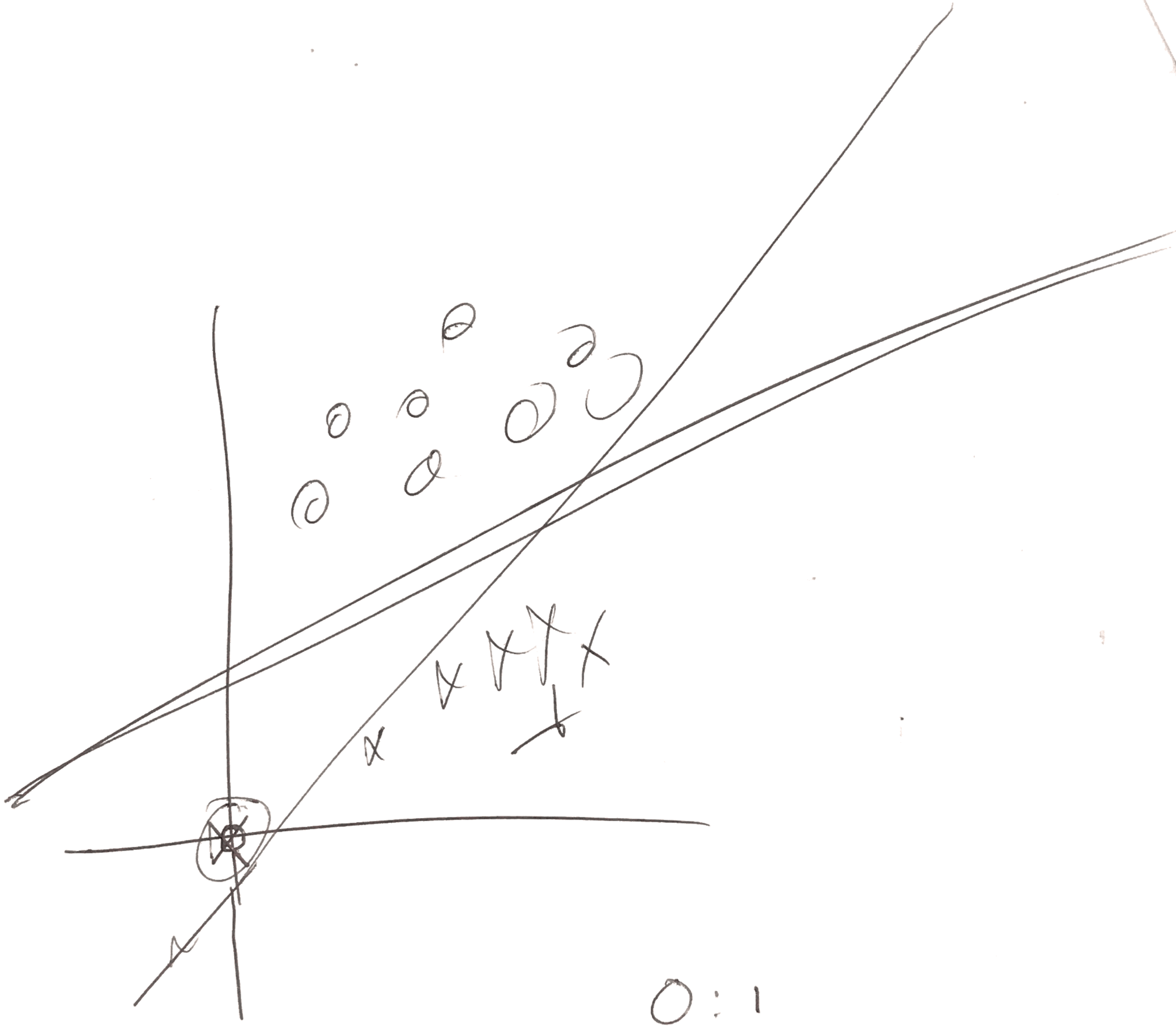
$$P(y=1 \mid x; \Theta_0, \Theta_1, \Theta_2, \Theta_3) = \sigma(\Theta_0 + \Theta_1 x_1 + \Theta_2 x_2 + \Theta_3 x_3)$$

$$= \frac{1}{1 + \exp(-(\Theta_0 + \Theta_1 x_1 + \Theta_2 x_2 + \Theta_3 x_3))}$$

$$= \frac{1}{1 + \exp(0 + \log(4) - \log(2) + \log(3))}$$

$$= \frac{1}{1 + \exp(0.7782)} = \frac{1}{1 + 2.178} = \frac{1}{3.178}$$

$$\approx 0.315$$



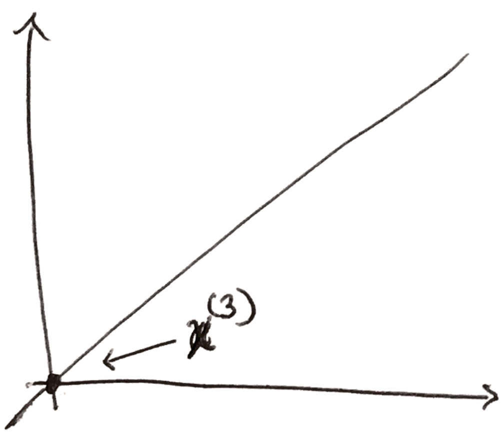
O : 1

X : 0

or model 1 it doesn't really matter because the absent of Θ_0 implies that the line is passing by the origin and because of the values for $x^{(3)}$ are 0's, the classification doesn't matter because the line is going to pass by it.

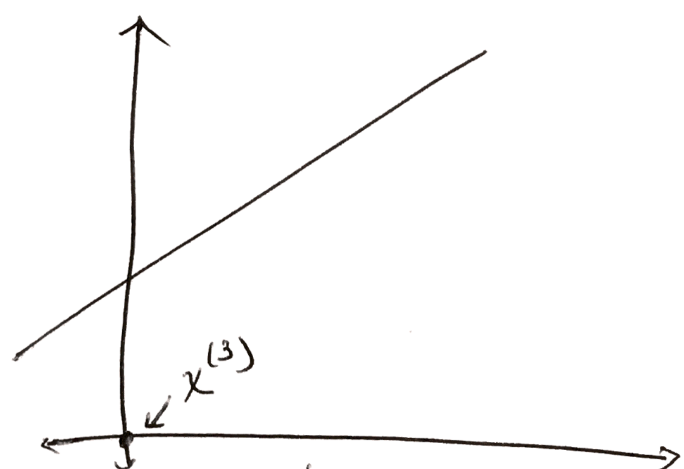
For model 2 it does hava an effect because the intercept could be elsewhere than the origin, which is the value of $x^{(3)}$.

This is a relresentation (fake):



model 1

As shown above, $x^{(3)}$ is going to be on the line.



model 2

Here $x^{(3)}$ will not, which does affect the overall line depending on the value for y.