7) c. $\chi^2(\theta) = \sum_{i=1}^{N} (y_i - M(x_i, \vec{\theta}))^2$

$$\frac{\partial \chi^2(\vec{\theta})}{\partial \theta_1} = \sum_{i=1}^{N} \left[\frac{d}{d\theta} (y_i - M(x_i, \vec{\theta}))^2 \right]$$

Regla cadena

$$= \sum_{i=1}^{N} \left[2(y - M(x, \vec{\theta}))\left(-\frac{\partial M(x_i, \vec{\theta})}{\partial \theta_i}\right) \right]$$

$$= -2\sum_{i=1}^{N} \left[(y - M(x_i, \vec{\theta})) \frac{\partial M(x_i, \vec{\theta})}{\partial \theta_i} \right]$$

d. $\vec{\theta}_{n+1} = \vec{\theta}_n - \gamma \cdot \underline{\vec{\nabla} \chi^2(\theta^2)}$ → Este gradiente es el mismo $\chi^2(\theta)$ pero con $\nabla \Rightarrow \frac{\partial \chi^2(\vec{\theta})}{\partial \theta_1}$

$$\Rightarrow \vec{\theta}_n - \gamma \cdot \left[-2\sum_{i=1}^{N} \nabla (y_i - M(x_i, \vec{\theta}))^2 \right]$$

$$\vec{\theta}_{n+1} = \vec{\theta}_n - \gamma \left[-2 \sum_{i=1}^{N} (y_i - M(x_i, \vec{\theta})) \cdot \nabla M(x_i, \vec{\theta}) \right]$$

$$\left[\frac{\partial M(x_i, \vec{\theta})}{\partial \theta_0}, \frac{\partial M(x_i, \vec{\theta})}{\partial \theta_i}, \frac{\partial M(x_i, \vec{\theta})}{\partial \theta_2} \right]$$