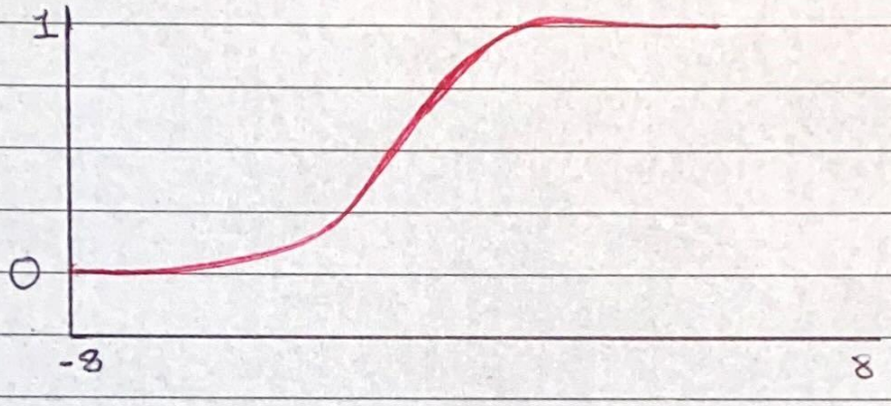
Logistic Regression from scratch

- Approximation $f(w,b) = wx + b$

$$\hat{y} = h_\theta(x) = \frac{1}{1+e^{-wx+b}}$$

- Sigmoid Function

$$S(x) = \frac{1}{1+e^{-x}}$$



- Cost Function (Cross Entropy) (log loss)

$$J(w,b) = J(\theta) = \frac{1}{N}\sum_{i=1}^{n}\left[y^i \log\left(h_\theta(x^i)\right) + (1-y^i)\log\left(1-h_\theta(x^i)\right)\right]$$

- Update Rules

$$w = w - \alpha \cdot dw$$
$$b = b - \alpha \cdot db$$

$$J'(\theta) = \begin{bmatrix} dJ/dw \\ dJ/db \end{bmatrix} = [\dots] = \begin{bmatrix} \frac{1}{N}\sum 2x_i(\hat{y}-y_i) \\ \frac{1}{N}\sum 2(\hat{y}-y_i) \end{bmatrix}$$