

①

$$a) \text{ squared error loss} = \|xw - d\|_2^2 = \left\| \begin{bmatrix} 1 & 1 \end{bmatrix} \begin{bmatrix} -1 \\ 0.5 \end{bmatrix} - \begin{bmatrix} -1 \end{bmatrix} \right\|_2^2$$

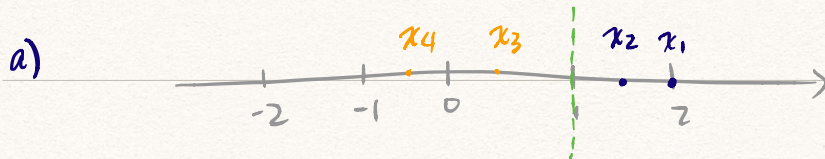
$$= \left\| \begin{bmatrix} -1.5 \\ -0.5 \end{bmatrix} - \begin{bmatrix} -1 \end{bmatrix} \right\|_2^2 = \left\| \begin{bmatrix} -0.5 \\ 1 \end{bmatrix} \right\|_2^2 = 1.25$$

$$b) \sum_{i=1}^2 (1 - d_i x_i^T w)_+ = (1 - (-1) \cdot [1 \ 1] \cdot \begin{bmatrix} -1 \\ 0.5 \end{bmatrix})_+ + (1 - [-1 \ 1] \cdot \begin{bmatrix} -1 \\ 0.5 \end{bmatrix})_+$$

$$= (1 - 0.5)_+ + (1 - 1.5)_+$$

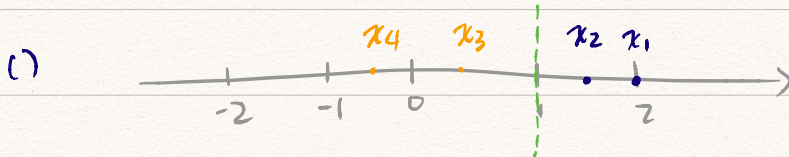
$$= 0.5$$

②.



$$\text{max margin classifier: } \begin{cases} \text{label} = 1 & \text{if } x \geq 1 \\ \text{label} = -1 & \text{if } x < 1 \end{cases}$$

b) see python script



this classifier makes no errors.

(e) Yes. No errors.