

Problem 1.

$$z^{(1)} = W_1 x + b_1 = \begin{bmatrix} 1 \times 1 + (-2) \times (-1) \\ 3 \times 1 + 4 \times (-1) \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} = \cancel{\begin{bmatrix} 3 \\ -1 \end{bmatrix}} \begin{bmatrix} 4 \\ -1 \end{bmatrix}$$

$$a^{(1)} = \text{ReLU}(z^{(1)}) = \begin{bmatrix} 4 \\ 0 \end{bmatrix}$$

$$z^{(2)} = W_2 x + b_2 = \begin{bmatrix} 2 \times 4 + 2 \times 0 \\ 2 \times 4 + (-3) \times 0 \end{bmatrix} + \begin{bmatrix} 0 \\ -4 \end{bmatrix} = \begin{bmatrix} 8 \\ 4 \end{bmatrix}$$

$$a^{(2)} = \text{ReLU}(z^{(2)}) = \begin{bmatrix} 8 \\ 4 \end{bmatrix}$$