Inclass Assignment -3

1] $w = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ $b = 4$ $x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$

$$w^T x + b = 0$$

$$\begin{bmatrix} 1 & 2 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} - 4 = 0$$

$$x_1 + 2x_2 + 3x_3 - 4 = 0$$

$$x_1 = -2x_2 - 3x_3 + 4$$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} -2x_2 - 3x_3 + 4 \\ x_2 \\ x_3 \end{bmatrix}$$

$$x = x_2 \begin{bmatrix} -2 \\ 1 \\ 0 \end{bmatrix} + x_3 \begin{bmatrix} -3 \\ 0 \\ 1 \end{bmatrix} + \begin{bmatrix} 4 \\ 0 \\ 0 \end{bmatrix}$$

2] $x_1 = -2x_2 - 3x_3 + 4$

3] x_2 and x_3 are free variables

* The system has infinitely many solutions

4] The dot product of "w" and vector on plane is 0 most of the time.