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Question) Solve the XOR problem using Logistic Regression.

$w = \begin{bmatrix} 5 \\ 5 \end{bmatrix}$, $b = -8$. , $w = \begin{bmatrix} -11 \\ -11 \end{bmatrix}$, $b = 6$.

$w = \begin{bmatrix} -1 \\ -1 \end{bmatrix}$, $b = 3$.

1. $x_1 \rightarrow$  $\rightarrow y_1$
   $x_2 \rightarrow$

2. $y_1 \rightarrow$  $\rightarrow \bar{y}$
   $y_2 \rightarrow$

3. $x_1 \rightarrow$  $\rightarrow y_2$
   $x_2 \rightarrow$

1. $z = X * w + b$

   $k = 1/(1+a)$

$y_1 = x_1 \; != x_2$

$y_2 = :$

$\bar{y} =$

x_1	x_2	XOR y_1	product y_2	$\bar{y}$	XOR
0	0	0	0	0	0
0	1	0	0	1	1
1	0	0	0	1	1
1	1	0	1	0	0

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1. $[0,0]\begin{bmatrix}5\\5\end{bmatrix} - 8 = -8 = 0$

$[0,0]\begin{bmatrix}5\\5\end{bmatrix} - 8 = -3 \quad 0$

$[1,0]\begin{bmatrix}5\\5\end{bmatrix} - 8 = -3 \quad 0$

$[1,1]\begin{bmatrix}5\\5\end{bmatrix} - 8 = 2 \quad 1$

2. $x_1 \rightarrow$ $x_2 \rightarrow$ $\square \rightarrow y_2$

$[0,0]\begin{bmatrix}-4\\-7\end{bmatrix} = 3 = 1$

$[0,1]\begin{bmatrix}-7\\-2\end{bmatrix} = -4 = 0$

$[1,0]\begin{bmatrix}-7\\-2\end{bmatrix} = -4 = 0$

$[1,1]\begin{bmatrix}-7\\-2\end{bmatrix} = -11 = 0$

y_1	y_2	$\bar{y}$
0	1	0
0	0	1
0	0	1
1	0	0

3. $y_1 \rightarrow$ $y_2 \rightarrow$ $\square \rightarrow z_1$

$[0,1]\begin{bmatrix}4\\-11\end{bmatrix} = -5 = 0$

$[0,0]\begin{bmatrix}-11\\-11\end{bmatrix} = 6 = 1$

$[0,0]\begin{pmatrix}-11\\-11\end{pmatrix} \pm 6 = 1$

$[1,0]\begin{bmatrix}-4\\-11\end{bmatrix} = -5 = 0$