对于$\vec{x}_4$，我们有$s_1 = -15.33$，$s_2 = 3.67$，$s_3 = 11.27$，对应的我们可以计算出$\vec{Y}_4 = (0.00,0.00,1.00)^T$，对照$\vec{Y}_4 = (0,0,1)^T$，此时对于样本$\vec{x}_4$分类是正确的。

第二个样本错分，计算$E_{in} = (-ln1 - ln0.27 - ln1 - ln1)/4 = 0.33$

第三次迭代：我们需要按照式（6）重新计算梯度去得到新的$\vec{w}_k$，仍以计算$\vec{w}_1$为例，先用式（6）计算梯度：

$$\frac{\partial E_{in}}{\partial \vec{w}_1} = \sum_{n=1}^{4} \frac{\partial E_{in}(\vec{x}_n)}{\partial \vec{w}_1} = (\hat{y}_1 - 1)\vec{x}_1 + (\hat{y}_1 - 1)\vec{x}_2 + \hat{y}_2\vec{x}_3 + \hat{y}_3\vec{x}_4$$

$$= (1-1)\vec{x}_1 + (0.27-1)\vec{x}_2 + 0\vec{x}_3 + 0\vec{x}_4$$

$$= (-0.73, -2.19, -4.38)^T$$

同 理 ， 我 们 可 以 得 到 ： $\frac{\partial E_{in}}{\partial \vec{w}_2} = 0\vec{x}_1 + 0.73\vec{x}_2 + (1-1)\vec{x}_3 + 0\vec{x}_4 = (0.73,2.19,4.38)^T$，$\frac{\partial E_{in}}{\partial \vec{w}_3} = 0\vec{x}_1 + 0\vec{x}_2 + 0\vec{x}_3 + (1-1)\vec{x}_4 = (0,0,0)^T$

用梯度下降法对$\vec{w}_k$进行更新：

$$\vec{w}_1^{(3)} = \vec{w}_1^{(2)} - \frac{\partial E_{in}}{\partial \vec{w}_1} = (-0.33,5,0)^T - (-0.73, -2.19, -4.38)^T$$
$$= (0.40, 7.19, 4.38)^T$$

$$\vec{w}_2^{(3)} = \vec{w}_2^{(2)} - \frac{\partial E_{in}}{\partial \vec{w}_2} = (0.67, -1,3)^T - (0.73,2.19,4.38)^T$$
$$= (-0.06, -3.19, -1.38)^T$$

$$\vec{w}_3^{(3)} = \vec{w}_3^{(2)} - \frac{\partial E_{in}}{\partial \vec{w}_3} = (-0.33, -4, -3)^T - (0,0,0)^T = (-0.33, -4, -3)^T$$

根据$\vec{w}_1^{(3)}$，$\vec{w}_2^{(3)}$和$\vec{w}_3^{(3)}$，我们用式（1）得到：

对于$\vec{x}_1$，我们有：$s_1 = \vec{w}_1^T \vec{x}_1 = (0.40, 7.19, 4.38)\begin{pmatrix}1\\3\\0\end{pmatrix} = 21.97$，$s_2 = \vec{w}_2^T \vec{x}_1 =$