Problem Set #2

Stewart Schuler G xxxx-5779

2.1)

a) $\frac{1}{2(0.05)^2} \ln\left(\frac{2(3)}{0.03}\right) \leq N =$ **1060**

b) $\frac{1}{2(0.05)^2} \ln\left(\frac{2(100)}{0.03}\right) \leq N =$ **1761**

c) $\frac{1}{2(0.05)^2} \ln\left(\frac{2(1000)}{0.03}\right) \leq N =$ **2683**

2.2)

a) A 9 dimentional perceptron

b) a set of all convex shapes

2.3)

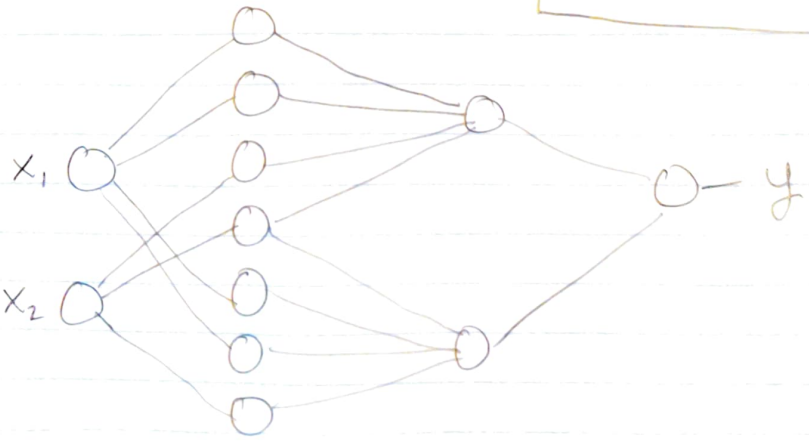
a) **3**

b) **4**

2.4)

$\frac{1}{2}N^2 + \frac{1}{2}N + 1 \cup \frac{1}{2}N^2 + \frac{1}{2}N + 1 =$ $\frac{1}{2}N^2 + \frac{1}{2}N + 1 + \sum_{n=1}^{N} \max(0, n-2)$

2.5)



2.6)

a) $y = \phi(\vec{v}\,\phi(\vec{w}\vec{x}))$

b) $h_1(x) = \max(0, [1\ 0\ 1]\begin{bmatrix}1\\2\\1\end{bmatrix})$

$= \max(0, 2)$

$= 2$

$h_2(x) = \max(0, [1\ -2\ 1]\begin{bmatrix}1\\2\\1\end{bmatrix})$

$= \max(0, -2)$

$= 0$

$y = \max(0, [0\ 1]\begin{bmatrix}2\\0\end{bmatrix})$

$= \max(0, 0)$

$\boxed{y = 0}$