Name:

NetID:

1.) Given the following perceptron and samples S_1 and S_2 with two features, <u>classify the points using the perceptron</u> and <u>run through an iteration of the weight updates for each misclassified sample</u>. Assume the activation function is the heaviside step function we saw in class, outputting either a -1 or a 1.

w = (0.5, 1, 0.6) $f(w^T x)$
x = (1, x_1, x_2)
η = 0.4

S_1 = (1, 1), Y = -1
S_2 = (-1, -1), Y = 1

$S_1:\ 0.5(1) + 1(1) + 0.6(1) = 2.1 \longrightarrow 1 \times$

$S_2:\ 0.5(1) + 1(-1) + 0.6(-1) = -1.1 \longrightarrow -1 \times$

$S_1:\ W_0' = 0.5 + (0.4)(1)(-1) = 0.1$

$\quad W_1' = 1 + (0.4)(1)(-1) = 0.6$

$\quad W_2' = 0.6 + (0.4)(-1)(1) = 0.2$

$S_2:\ W_0' = 0.1 + (0.4)(1)(1) = 0.5$

$\quad W_1' = 0.6 + (0.4)(1)(-1) = 0.2$

$\quad W_2' = 0.2 + (0.4)(1)(-1) = -0.2$

w' = (0.5, 0.2, -0.2)