CS691 Quiz 4 Name _____

1. Given the following activation $a = \sum w_i x_i$, our neuron "fires" if $a > 0$. How do we change the threshold from 0 to some value θ? (2 points)

2. Given a neuron with parameters $w = [1, 1, 0]$ and $b = -1$, which of the following points are on the decision boundary for the neuron? How do you know? (3 points)
   $p_1 = (1, 2, 3)$
   $p_2 = (1, 2, -3)$
   $p_3 = (8, -1, 0)$
   $p_4 = (2, 6, -8)$
   $p_5 = (3, -2, 1)$

3. We are training a perceptron model. We have one feature, x_1. For some sample, s, with label $y = -1$, we get $a > 0$. Using the update rules for the perceptron, show that we will do better on sample s after we update w and b. (3 points)

4. Given a perceptron model with parameters $w = [1, 2, 3, 4, 5]$, $b = 1$. How would the model classify the following samples? (3 points)
   (a) $x = [-2, -4, 3, 1, 1]$
   (b) $x = [-5, -2, 0, 1, 1]$

CS491 Quiz 4 Name _____

1. The perceptron is a model and an algorithm. True or False. Circle one and explain. (2 points)

2. You are training a perceptron with a set of data that has F features, how many parameters does your model have? Explain. (2 points)

3. We have trained a neuron using the perceptron algorithm until convergence. Our resulting weights are $w = [5, -4, 2, -6, 12, 1]$ and $b = 0$. Which feature, $x_1, x_2, x_3, x_4, x_5, x_6$ would you say is the most important? Why? (2 points)

4. Given a perceptron model with parameters $w = [1, 2, 3, 4, 5]$, $b = 1$. How would the model classify the following samples? (4 points)
   (a) $x = [4, 1, 5, 2, 3]$
   (b) $x = [-1, 1, -1, 1, -1]$
   (c) $x = [1, 4, 3, 4, 1]$
   (d) $x = [-5, -2, 0, 1, 1]$