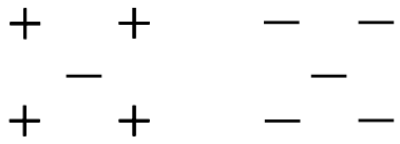
United International University
Department of Computer Science and Engineering
CSE 489 Machine Learning,
Class Test 01, Spring 2019, Secton C
Total Marks: 20, Time: 30 minutes

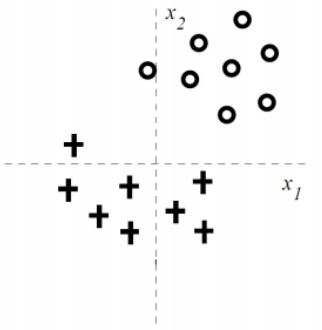
Student ID:
Name:



1. Consider the dataset above with two classes. What will be the 10-fold cross validation error if Logistic regression is used?
2. For the same figure, what will be the training error if the whole dataset is used for training for Logistic regression model?
3. Consider the following data:

x	1	2	3	4
y	6	10	11	13

Suppose, somebody is trying to learn y based on x using linear regression using the equation $\hat{y} = w_0 + w_1 x$. Consider the values of the wights $w_0 = 5$ and $w_1 = 2$. Find out the error in terms of Squared Error (SE).



4. Reason whether the following function can be used as an activation function for Logistic regression.

$$tanh(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}$$

Bonus Someone is trying to learn the data above using logistic regression. It is clearly linearly separable data. So we can assume that training error achieved will be zero if considered only cross-entropy loss function. However, here is some person using the following loss function:

$$L(x, y, W) = -\sum_{i=1}^{m}(y(i)log(\hat{y}(i)) + (1 - y(i))log(1 - \hat{y}(i))) + C_0 w_0^2 + C_1 w_1^2 + C_2 w_2^2$$

What do you think of the training error (increases/decreases/remains same) for the following situations:

(a) $C_1 = 10000, C_0 = C_2 = 0$
(b) $C_2 = 10000, C_1 = C_0 = 0$