Islamic University of Technology (IUT) CSE Department

CSE 4621: Machine Learning Quiz #02
Time 20 Minutes Marks: 15

Instructions:

i. CLOSED book exam. No browsing. Keyboard use is prohibited.
ii. Keep your camera ON throughout the test time.
iii. Write your Student ID & Page Number at the top of each page.
iv. At the end of the test, take pictures of your script and convert it to a single pdf file.
v. Capture & Submit during the upload session ONLY. DO NOT take pictures or upload even if your exam finishes early.

1. How did a sigmoid function convert a linear regression problem into a classification problem? Show the decision boundary in contrast to sigmoid function. 5

2. Show that for a logistic function σ the following equation is true: 4

$$\sigma(-a) = 1 - \sigma(a)$$

3. Suppose you trained a logistic regression model with regularization three times and ended up with the following values for the parameters $\begin{bmatrix} \theta_1 \\ \theta_2 \end{bmatrix}$: 3×2

First case: $\begin{bmatrix} 18.34 \\ 9.12 \end{bmatrix}$

Second case: $\begin{bmatrix} 4.19 \\ 0.23 \end{bmatrix}$

Third case: $\begin{bmatrix} 5.78 \\ 0 \end{bmatrix}$

Comment on the choices of *Regularization parameter* and *Regularization term* you might have pick for those individual cases. Justify your answer in brief.