Quiz 1

Suppose that you have trained a logistic regression classifier, and it outputs on a new example xx a prediction h_\theta(x)$h_\theta(x)$ = 0.2. This means (check all that apply):

Our estimate for P(y=0|x;θ) is 0.8.

Our estimate for P(y=1|x;θ) is 0.2

2.
Question 2
Suppose you have the following training set, and fit a logistic regression classifier h_\theta(x) = g(\theta_0 + \theta_1x_1 + \theta_2 x_2)$h_\theta(x)=g(\theta_0+\theta_1x_1+\theta_2x_2)$. Which of the following are true? Check all that apply.

J(θ) will be a convex function, so gradient descent should converge to the global minimum.

Adding polynomial features (e.g., instead using hθ(x) = g(θ0 + θ1x1 + θ2x2 + θ3x2 + θ4x1x2 + θ5x2)) could increase how well we can fit the training data

3.
Question 3
For logistic regression, the gradient is given by \frac{\partial}{\partial \theta_j} J(\theta) = \frac{1}{m}\sum_{i=1}^m{ (h_\theta(x^{(i)}) - y^{(i)}) x_j^{(i)}}$\frac{\partial}{\partial\theta_j}J(\theta)=m1\sum_{i=1}^m(h_\theta(x^{(i)})-y^{(i)})x_j^{(i)}$. Which of these is a correct gradient descent update for logistic regression with a learning rate of \alpha$\alpha$? Check all that apply.

$$\theta := \theta - \alpha \frac{1}{m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)}) x^{(i)}.$$

$$\theta := \theta - \alpha \frac{1}{m} \sum_{i=1}^{m} \left(\frac{1}{1+e^{-\theta^T x^{(i)}}} - y^{(i)} \right) x^{(i)}.$$

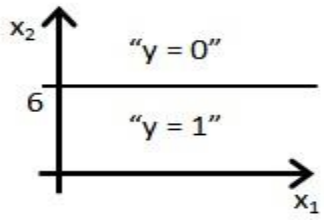
4.
Question 4
Which of the following statements are true? Check all that apply.

The cost function J(θ) for logistic regression trained with examples is always greater than or equal to zero.

The sigmoid function is never greater than one

Suppose you train a logistic classifier h_\theta(x) = g(\theta_0 + \theta_1x_1 + \theta_2 x_2)$h_\theta(x)=g(\theta_0+\theta_1x_1+\theta_2x_2)$. Suppose \theta_0 = 6, \theta_1 = -1, \theta_2 = 0$\theta_0=6,\theta_1=0,\theta_2=-1$. Which of the following figures represents the decision boundary found by your classifier?

Figure:



Quiz 2

1.
Question 1
You are training a classification model with logistic

regression. Which of the following statements are true? Check

all that apply.

Adding a new feature to the model always results in equal or better performance on the training set.

2. Suppose you ran logistic regression twice, once with $\lambda = 0$, and once with $\lambda = 1$. One of the times, you got parameters $\theta = \begin{bmatrix} 74.81 \\ 45.05 \end{bmatrix}$, and the other time you got $\theta = \begin{bmatrix} 1.37 \\ 0.51 \end{bmatrix}$. However, you forgot which value of λ corresponds to which value of θ. Which one do you think corresponds to $\lambda = 1$?

$[45.05]$

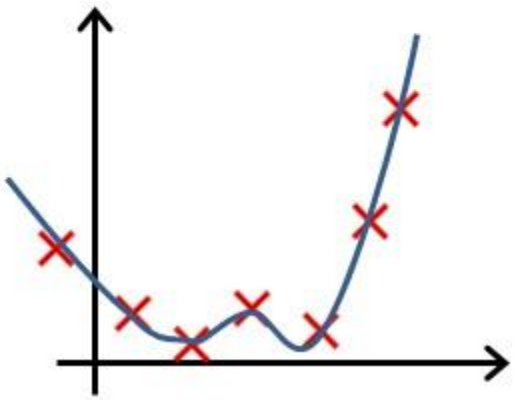
◉ $\theta = \begin{bmatrix} 1.37 \\ 0.51 \end{bmatrix}$

3.
Question 3
Which of the following statements about regularization are

true? Check all that apply.

☑ . Using too large a value of \lambdaλ can cause your hypothesis to underfit the data.
4.
Question 4
In which one of the following figures do you think the hypothesis has overfit the training set?

◉ Figure:



5.
Question 5
In which one of the following figures do you think the hypothesis has underfit the training set?

Figure: