Regularization

Question 1

You are training a classification model with logistic regression.

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

- [ ] Adding mant new features to the model helps prevent overfitting on the training set.
- [ ] Introducing regularization to the model always results in equal or better performance on the training set.
- [ ] Introducing regularization to the model always results in equal or better performance on examples not in the training set.
- [x] **Adding a new feature to the model always results in equal or better performance on the training set.**

Question 2

Suppose you ran logistic regression twice, once with $\lambda = 0$, and once with $\lambda = 1$.

One of the times, you got parameters $\theta = \begin{bmatrix} 81.47 \\ 12.69 \end{bmatrix}$, and the other time you got $\theta = \begin{bmatrix} 13.01 \\ 0.91 \end{bmatrix}$.

However, you forgot which value of λ corresponds to which value of θ.

Which one do you think corresponds to $\lambda = 1$?

- [x] $\theta = \begin{bmatrix} 13.01 \\ 0.91 \end{bmatrix}$
- [ ] $\theta = \begin{bmatrix} 81.47 \\ 12.69 \end{bmatrix}$

Question 3

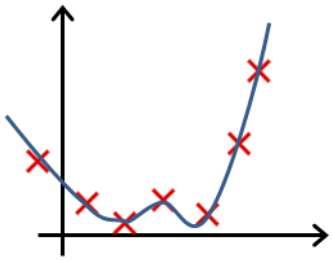
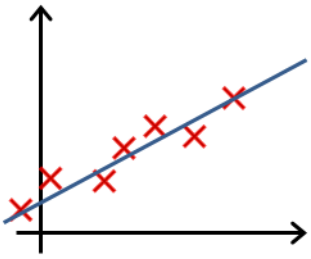
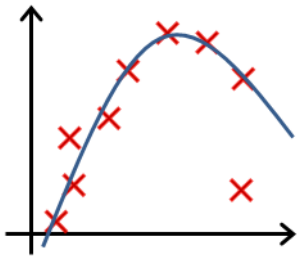
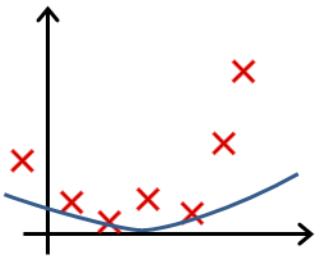
Which of the following statements about regularization are true? Check all that apply.

- [ ] Because logistic regression outputs values $0 \leq h_\theta(x) \leq 1$, it's range of output values can only be "shrunk" slightly by regularization anyway, so regularization is generally not helpful for it.
- [x] **Using too large a value of λ can cause your hypothesis to underfit the data.**
- [ ] Because regularization causes $J(\theta)$ to no longer be convex, gradient descent may not always converge to the global minimum (when $\lambda > 0$, and when using an appropriate learning rate α).

- [ ] Using a very large value of λ cannot hurt the performance of your hypothesis; the only reason we do not set λ to be too large is to avoid numerical problems.

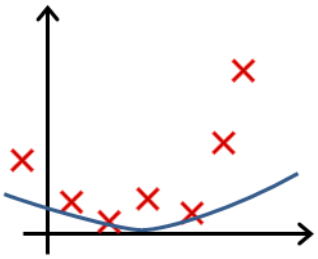
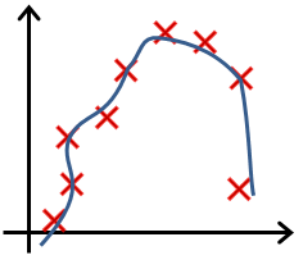
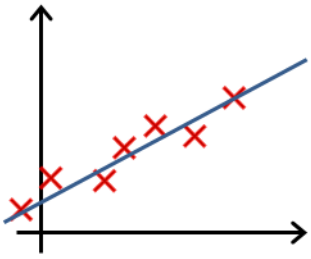
Question 4

In which one of the following figures do you think the hypothesis has overfit the training set?

- [x] 
- [ ] 
- [ ] 
- [ ] 

Question 5

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

- [x] 
- [ ] 
- [ ] 
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