Quiz passed!

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(True/False) A linear classifier can only learn positive coefficients.



True

False

**Correct Response** 



2. (True/False) In order to train a logistic regression model, we find the weights that maximize the likelihood of the model.



True

**Correct Response** 





 $\textbf{3.} \quad \text{(True/False) The data likelihood is the product of the probability of the inputs $x$ given the}\\$ weights w and response y.



True

False

**Correct Response** 



Questions 4 and 5 refer to the following scenario.

Consider the setting where our inputs are 1-dimensional. We have data

X	V
1000 6 1	, 1
2.5	+1
0.3	-1
2.8	+1
0.5	+1

and the current estimates of the weights are w0 = 0 and w1 = 1. (w0: the intercept, w1: the weight for x).

Calculate the likelihood of this data. Round your answer to 2 decimal places.

0.23

**Correct Response** 

$$P(y_1 = +1|x_1, w)P(y_2 = -1|x_2, w)P(y_3 = +1|x_3, w)P(y_4 = +1|x_4, w)$$

$$= \frac{1}{1 + e^{-2.5}} \frac{e^{-0.3}}{1 + e^{-0.3}} \frac{1}{1 + e^{-2.8}} \frac{1}{1 + e^{-0.5}}$$

$$= 0.230765 \cdots$$



5. Refer to the scenario given in Question 4 to answer the following:

points

Calculate the derivative of the log likelihood with respect to w1. Round your answer to 2 decimal places.

0.36

**Correct Response** 

$$\frac{\partial \ell(\mathbf{w})}{\partial \mathbf{w}_1} = \sum_{i=1}^4 h_1(\mathbf{x}_i) \Big( \mathbf{1}[y_i = +1] - P(y_i = +1|\mathbf{x}_i, \mathbf{w}) \Big) 
= 2.5 \left( 1 - \frac{1}{1 + e^{-2.5}} \right) + 0.3 \left( 0 - \frac{1}{1 + e^{-0.3}} \right) 
+ 2.8 \left( 1 - \frac{1}{1 + e^{-2.8}} \right) + 0.5 \left( 1 - \frac{1}{1 + e^{-0.5}} \right) 
= 0.366591 \cdots$$



Which of the following is true about gradient ascent? Select all that apply.

points

It is an iterative algorithm

It only updates a few of the parameters, not all of them

**Correct Response** 

**Correct Response** 

It finds the maximum by "hill climbing"

**Correct Response**