1. Consider sentiment classification through logistic regression. For a given text, consider the following feature and their values:

Var	Definition	Value in Fig.
x_1	count(positive lexicon words $\in$ doc)	3
x_2	count(negative lexicon words $\in$ doc)	2
x_3	$\begin{cases} 1 & \text{if "no"} \in \text{doc} \\ 0 & \text{otherwise} \end{cases}$	1
x_4	count(1st and 2nd pronouns $\in$ doc)	3
x_5	$\begin{cases} 1 & \text{if "!"} \in \text{doc} \\ 0 & \text{otherwise} \end{cases}$	0
x_6	log(word count of doc)	$\ln(66) = 4.19$

Let the corresponding six weights be [2.5, -5.0,-1.2, 0.5, 2.0, 0.7] and b= 0.1. For decision boundary, consider:

$$\text{decision}(x) = \begin{cases} 1 & \text{if } P(y=1|x) > 0.5 \\ 0 & \text{otherwise} \end{cases}$$

where, 1 denotes positive sentiment.

Compute the sentiment classification of the above.

2. Consider the task of period disambiguation. What sort of features would you suggest that will be helpful in the corresponding classification problem.

3. Compare logistic regression and Naïve Bayes.

4. Why do we need regularization? Compare L1 vs. L2 regularization.