MALIS

Group Exercise

October 18 2022

Group Name:	
Group Members:	

Probability Refresher

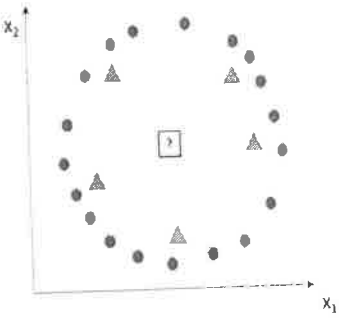
1. True/False For a continuous random variable x and its probability density function p(x), it holds that $0 \leq p(x) \leq 1$ for all x. Justify your answer

False. The pdf is not bounded. Probabilities are.

Bayes Classifier

2. Consider the figure below. Suppose you train a Bayes classifier using the triangles and circles as training data. What class will be predicted for the testing point (?) in the figure? Justify your answer.

Circle. Largest prior for it. Similar μ and covariance is the same for all



Logistic Regression

3. Suppose you train a logistic regression classifier of the form $\hat{y} = h(\boldsymbol{x}) = \sigma(w_0 + \boldsymbol{w}^T \boldsymbol{x})$, where $\sigma(\cdot)$ is the sigmoid function and $x \in \mathbb{R}^2$. You obtain the following model parameters: $w_0 = 3$, $\mathbf{w} = [0;-1]^T$. Plot the decision boundary of this classifier showing the regions where y = 0 and y = 1.

$\sigma(3 - X_2)$

$\hat{y} = \begin{cases} 1 & 3 - X_2 > 0 \\ 0 & 3 - X_2 \leq 0 \end{cases}$