Problem 1 (3 + 3 + 4 + 2)

(a)

(3 points) Consider a binary classi

cation problem with $Y \in \{-1, +1\}$ and two real-valued features, $X_1, X_2 \in \mathbb{R}$. Suppose that we have learned a (Gaussian) naive Bayes classi

er and obtained parameter estimates $\hat{\mu}_{-,j} = 0, \hat{\sigma}^2_{-,j} = 1$ and $\hat{\mu}_{+,j} = 0, \hat{\sigma}^2_{-,j} = 16$ for $j \in \{1, 2\}$. Further, we use a uniform class prior $\hat{p}(y) = 1/2$ for $y \in \{-1, +1\}$. Use the Bayes formula to compute the posterior probability

$$P(Y = +1 | X_1 = 1, X_2 = 2)$$