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Exercise 3.2
Bayes Classifiers as Linear Discriminants

Instructions: You may discuss this assignment with other students in the class, but you must submit your own answers to the questions below. Include an honor pledge with your submission. Submit online and in PDF. This exercise is ungraded.

1. Freshwater lakes are susceptible to algae blooms. You have data that shows that lakes with algae blooms have an average pH values of 8.1 and an average O2 value of 9.8 with the following variance-covariance matrix:

$$\begin{bmatrix} 1.0 & 0.5 \\ 0.5 & 1.0 \end{bmatrix}$$

Assume that lakes without algae blooms have an average pH values of 7.2 and an average O2 value of 7.8 with the same variance-covariance matrix. What this the formula for the Bayes optimal classier for a pH reading of x_1 and a O2 reading of x_2?