Problem 1:
Consider a two-category classification problem having

- $\Omega = \{\omega_1, \omega_2\}$
- $P(x | \omega_1) = \text{N}(3, 1)$ (Normal distribution with $\mu = 3, \sigma^2 = 1$)
- $P(x | \omega_2) = \text{N}(2, 2)$
- $P(\omega_1) = \frac{3}{4}$
- $P(\omega_2) = \frac{1}{4}$
- $\lambda_{11} = 0, \lambda_{12} = 2, \lambda_{21} = 1, \lambda_{22} = 0$

where $\lambda_{ij}$ is the loss incurred by classifying a sample that belongs to class $\omega_i$ as class $\omega_j$.

What are the optimal decision regions?

Please give exact solutions, as well as a numeric approximations if appropriate.

Problem 2:
Pattern Classification text, chapter 2, problem 12.

Problem 3:
Pattern Classification text, chapter 2, problem 13.

Problem 4 (required only for 6000 level):
Pattern Classification text, chapter 2, problem 14, parts a, b, and c.

Problem 5 (required only for 6000 level):
Pattern Classification text, chapter 2, problem 31.

Problem 6:
Pattern Classification text, chapter 3, problem 1.