1. Let $X_1, \ldots, X_n \sim \text{Uniform}(\theta, \theta + 1)$.

   (a) Find a minimal sufficient statistic.

   (b) Show that X_3 is not a sufficient statistic.

2. Chapter 6, problem 1.

3. Chapter 9, Problem 2(a), 2(b), 2(c).

4. Let $X_1, \ldots, X_n \sim N(\mu, \sigma^2)$ where σ^2 is known. Let $\mu \sim N(a, b^2)$.

   (a) Find the Bayes estimator for μ under squared error loss.

   (b) Find the risk of the estimator.

   (c) Find the maximum risk.

   (d) Find the Bayes risk.

5. Let $X_1, \ldots, X_n \sim \text{Bernoulli}(p)$. Let $L(p, \widehat{p}) = (p - \widehat{p})^2$.

   (a) Let $\widehat{p}$ be the Bayes estimator using a $\text{Beta}(\alpha, \beta)$ prior. Find the Bayes estimator.

   (b) Compute the risk function.

   (c) Compute the Bayes risk.

   (d) Find α and β to make the risk constant and hence find the minimax estimator.