1. Exercise 7.6.14
   *(Hint: Consider the difference between the sampling plans corresponding to parts a. and b. and choose an appropriate distribution for each of the two scenarios.)*

2. Exercise 7.6.16

3. Exercise 7.10.10

4. Exercise 8.8.3

5. Exercises 8.8.4 and 8.8.5

6. Exercise 8.5.4

7. Exercise 8.5.6

8. Exercise 8.5.7

9. Consider the Cauchy distribution with p.d.f. given by
   \[ f(x \mid \theta) = \frac{1}{\pi[1 + (x - \theta)^2]} \quad \text{for} \quad -\infty < x < \infty \]
   where \( \theta \) is the location parameter of the distribution \((-\infty < \theta < \infty)\).
   (a) Suppose that \( X = (X_1, \ldots, X_n) \) is a random sample from the Cauchy distribution above with unknown parameter \( \theta \). Develop the Newton-Raphson method to compute the maximum likelihood estimate of \( \theta \) based on the observed sample \( x \).
   (b) Consider a data set, \( x = (-0.774, 0.597, 7.575, 0.397, -0.865, -0.318, -0.125, 0.961, 1.039) \), assumed to arise from the Cauchy distribution above. Apply the Newton-Raphson method from part (a) to estimate \( \theta \). To check your results, try different starting values for the Newton-Raphson algorithm and also plot the likelihood function for \( \theta \).
   (c) Consider another data set, \( x = (0, 5, 9) \), again, assumed to arise from the same Cauchy distribution. Apply again the Newton-Raphson method from part (a) to estimate \( \theta \), using different starting values, including for instance, \( \theta^0 = -1, \theta^0 = 4.67, \theta^0 = 10 \). As in part (b), plot the likelihood function, and comment on the results.