10.100 Let $Y_1, Y_2, \ldots, Y_n$ denote a random sample from a population having a Poisson distribution with mean λ_1. Let $X_1, X_2, \ldots, X_m$ denote an independent random sample from a population having a Poisson distribution with mean λ_2. Derive the most powerful test for testing $H_0: \lambda_1 = \lambda_2 = 2$ versus $H_a: \lambda_1 = 1/2,\ \lambda_2 = 3$.

10.101 Suppose that $Y_1, Y_2, \ldots, Y_n$ denote a random sample from a population having an exponential distribution with mean θ.

a Derive the most powerful test for $H_0: \theta = \theta_0$ against $H_a: \theta = \theta_a$, where $\theta_a < \theta_0$.

b Is the test derived in part (a) uniformly most powerful for testing $H_0: \theta = \theta_0$ against $H_a: \theta < \theta_0$?