MATH3423 - Statistical Inference
Assignment 6

1. Q7 in Exercise 4

2. Q13 in Exercise 4

3. Q15 in Exercise 4

4. X has the distribution $P_0(\theta)$. We test the simple hypothesis $H_0 : \theta = 1/2$ against the alternative hypothesis $H_1 : \theta < 1/2$ by taking a random sample of size 12 and rejecting $H_0 : \theta = 1/2$ if and only if the observed values X_1 X_2..... X_{12} are such that $\sum_{i=1}^{12} X_i \leq 2$. Find the power of the test Q(1/2),Q(1/3) Q(1/4) Q(1/12).

5. Q4(b) in final exam of 2015

   Let $(X_1, ..., X_n)$ be a random sample from $U(0, \theta)$ with $\theta > 0$.

   (a) (**4 marks**) Find UMP test at the level of significance α for testing $H_0 : \theta \leq \theta_0$ versus $H_1 : \theta > \theta_0$.

   (b) **(2 marks)** Based on the test derived in part (i), calculate the minimum sample size n such that the test for testing $H_0 : \theta \leq \frac{1}{2}$ versus $H_1 : \theta > \frac{1}{2}$ has a power of at least 0.98 at $\theta_1 = \frac{3}{4}$, where $\theta_1 \in \Theta_1$, when $\alpha = 0.05$.

   (c) **(2 marks)** Based on the test derived in part (i), calculate the power at $\theta_1 = \frac{2}{3}$, where $\theta_1 \in \Theta_1$, for testing $H_0 : \theta \leq \frac{1}{2}$ versus $H_1 : \theta > \frac{1}{2}$ when $\alpha = 0.05$ and $n = 10$.