STA 3000F Assignment 8.

1. Let Y_1 and Y_2 be independent Binomial random variables with sample sizes n_1 and n_2 and with probability of success p_1 and p_2 respectively. Find the uniformly most powerful similar test for testing $H_0 : p_1 = p_2$ against $H_A : p_1 > p_2$. Find the (conditional) p-value for testing H_0 given the observations $y_1 = 44$, $y_2 = 9$, with $n_1 = 53$, $n_2 = 9$.

2. Let $Y_1, \ldots, Y_n$ be i.i.d from the two parameter Gamma model

$$f(y; \psi, \lambda) = \frac{1}{\Gamma(\psi)} \lambda^{\psi} y^{\psi - 1} e^{-\lambda y}.$$

   Find the form of the UMP similar test for testing $H_0 : \psi = \psi_0$ against $H_1 : \psi > \psi_0$. Compare this to the form of the score test; i.e. that based on $w_u(\psi) = U(\psi, \hat{\lambda}_{\psi})^T \{n^{-1} i^{\psi\psi}(\psi, \hat{\lambda}_{\psi})\} U(\psi, \hat{\lambda}_{\psi})$.