Coding in advance of the March 4, 2019 class

Use the Poisson log likelihood and chi squared codes you wrote two weeks ago to do discrete parameter estimation.

In particular, use the data sets on the website (data6_1.txt, data6_2.txt, data6_3.txt, and data6_4.txt) to estimate a single parameter for rolls of a die. Our model is that the probability of getting a 1 is $1-p$, and the probability for getting a 2, 3, 4, 5, or 6 is $p/5$. Let our prior probability density be uniform in p, from $p = 0$ to $p = 1$. Based on each data set, what is the posterior probability density for p if we use the Poisson likelihood? How about if we use Wilks' Theorem, where we look for $\Delta \ln \mathcal{L} = -0.5$ from the maximum for the 68.3% credible region? How about if we use χ^2 (using the correct model variance), where we would use $\Delta\chi^2 = 1$ from the minimum for the 68.3% credible region? Note that the χ^2 calculation can in this case be performed analytically, but I recommend that you save time and do it numerically. What conclusions do you draw?