

Economics 520, Fall 2008
Homework 4
Due Tuesday, Sept 30 at beginning of class

This week's exercises will use R. Please read the two R tutorials posted on the web site for information about R commands and syntax that will be helpful for solving the homework.

1. Poisson random variables:
 - (a) Generate 1000 draws from a Poisson distribution with parameter $\lambda = 1$. Construct a histogram of the draws, using the `hist` function. (Hint: when using `hist`, set `breaks=50` so that the histogram clearly separates the support points.) Calculate the sample mean and variance of the 1000 draws, and compare these to the theoretical values. Also calculate the relative frequency of $X = 2$ in your sample of 1000 draws, and compare this to the theoretical value.
 - (b) Repeat part (a), but with $\lambda = 4$. Using the histograms, compare this distribution to the distribution in part (a).
2. Normal random variables:
 - (a) Generate 1000 draws from a $N(0, 1)$ distribution, using the `rnorm` function. (Do not print out all 1000 draws, but keep them stored in a single vector variable for the next two parts of this question). Find the approximate probability that a $N(0, 1)$ random variable is greater than 1, based on your 1000 draws.
 - (b) Using the 1000 draws from the previous question, generate 1000 draws from a $N(1, 2)$ random variable. (Do not generate new random draws.) Find the approximate probability that a $N(1, 2)$ random variable is greater than 1.5.
 - (c) Using the same 1000 draws as before, generate 1000 draws for $Y = X^2$, where X has a standard normal distribution. What is the support of this distribution? What is the approximate mean of the distribution of Y , and the approximate variance of Y , and the approximate probability that Y is greater than 2?
3. Use R to evaluate the probability indicated in the parenthetical remarks to CB question 3.5.