STAT 242/542b, Theory of Statistics, HW #2

(Ch5:8)
Suppose we have a computer program consisting of $n = 100$ pages of code. Let X_i be the number of errors on the i^{th} page of code. Suppose that the $X_i's$ are Poisson with mean 1 and that they are independent. Let $Y = \sum_{i=1}^{n} X_i$ be the total number of errors. Use the central limit theorem to approximate $\mathbb{P}(Y < 90)$.

(Ch6:1)
Let $X_1, X_2, \cdots, X_n \sim$ Poisson(λ) and let $lam\hat{b}da = n^{-1}\sum_{i=1}^{n} X_i$. Find the bias, se, and MSE of this estimator.

(Ch6:2)
Let $X_1, X_2, \cdots, X_n \sim$ Uniform$(0, \theta)$ and let $\hat{\theta} = \max\{X_1, X_2, \cdots, X_n\}$. Find the bias, se, and MSE of this estimator.

(Ch6:3)
Let $X_1, X_2, \cdots, X_n \sim$ Uniform$(0, \theta)$ and let $\hat{\theta} = 2\overline{X}_n$. Find the bias, se, and MSE of this estimator.

(Ch7: 4)
Let $X_1, X_2, \cdots, X_n \sim F$ and let $\hat{F}_n(x)$ be the empirical distribution function. For a fixed x, use the central limit theorem to find the limiting distribution of $\hat{F}_n(x)$.