Math 474 - Homework # 7
The Poisson Distribution and the Normal approximation to Binomial Random Variables

1. Suppose you toss one 6-sided dice 100 times.
   (a) Estimate the probability that you will get between 0 and 15 fours occuring.
   (b) Estimate the probability that you get exactly 15 fours occuring.
2. Let X be a Poisson random variable with parameter $\lambda > 0$.
   (a) Show that $E[X] = \lambda$.
   (b) Show that $\text{Var}[X] = \lambda$.
3. Sketch the probability distribution function for the Poisson random variable with parameter $\lambda = 1$.
4. Based on past experience, 1% of the telephone bills mailed to households are incorrect. If a sample of 20 bills is selected, find the probability that at least one bill will be incorrect. Do this using two probability distributions (the binomial and the Poisson) and briefly compare and explain your results.