**1.6**

The convergence in probability definition states that a sequence of random variables (in this case, the minimums from random samples of the exp(1) distribution) converges to some random variable as the sample size grows. In this simulation, we show that as the sample size of an exp(1) distribution grows, the minimum converges to 0. As the sample size increases, the distribution of the minimum of the sample becomes more and more concentrated about 0. The graph created displays how the probability that the minimum of the sample is “close” (within the epsilon value of 0.05) to zero approaches 1.

**1.8**

In the graph, as n increases, the distribution of the sample minimum becomes more concentrated towards 0. As n approaches infinity, the minimum of each random sample will converge to 0.

**2.4**

The 12 plots above exhibit the Central Limit Theorem which states the distribution of the mean of a Random Variable sample () is well approximated by the Normal Distribution with mean = and variance =. We ran the simulation with three different lambdas (1, 5, 25) with four different sample sizes (5, 10, 30, 100). For each of the lambdas, as n increased, the distribution of was better approximated by the Normal(,).

**2.5**

For the Poisson Distribution, as increases, the distribution becomes more Normal. If the random samples are being taken from a parent population that can be better approximated by the Normal Distribution, the distribution of the sample means will also be Normal. This is why the sample mean distribution looks Normal at a sample size of 5 while the does not look Normal at the same sample size.