Math 324 Spring 2016

Name

1.Use 500 samples of size k where k = 10 and 50 from the following distributions:

a) Uniform distribution on interval (0,5)

b) Gamma distribution with α=4, β=1/2

i. For each part find the empirical mean of the sample means. What is the theoretical values of

expected values of the sample means?

ii. For each part find the variance of sample means. What is the theoretical value of the

variance of the sample means.

iii. Draw a histogram for the means.

iv. Draw the normal probability plot of means

v. Explain you results (using central limit theorem)

2. The life time of a laser (in hours) is exponentially distributed with lambda= 1/80. Two such

lasers are operating independently.

a) Use a simulated sample of size 1000 to estimate the probability that the sum of the two

lifetimes is greater than 100 hours.

b) Estimate the probability that the both lasers last more than 50 hours.

Hand in:

The source code.

The output

**Directions:**

**The program is due at the beginning of the session on the due date.**

**Use this page as the cover page with your name.**

**Use comments in your programs.**

**Each source and output must be clearly marked with the question number.**

**Circle the answers.**

Help:

To generate random numbers you use the following R commands:

a) uniform distribution- “runif(n, min=0, max=1)”

b)gamma distribution “rgamma(n, shape=alpha, scale=beta)

c) exponential distribution “rexp(n, lambda)