

Homework #2

1. Given density function  $f(x) = c * x^3 * exp(-5x)$ , determine the values of the parameters shape, rate and scale in R.

2. Generate 3 sets of random numbers of size 15 from a lognormal distribution and construct 3 qqplot and CB plot figures against the same distribution.

3. Generate 3 sets of random numbers of size 100 from a lognormal distribution and construct 3 qqplot and CB plot figures against the same distribution.

4. Make comments on the figures in Exercises 2 and 3.

5. Generate 3 sets of random numbers of size 15 from a lognormal distribution and construct 3 qqplot and CB plot figures against the normal distribution.

6. Generate 3 sets of random numbers of size 100 from a lognormal distribution and construct 3 qqplot and CB plot figures against the normal distribution.

7. Make comments on the figures in Exercises 5 and 6.

8. Based on the given data,

[1] 0.39 0.19 2.10 0.58 1.22 0.30 0.33 0.14 0.59 0.17 0.53 0.73 0.10 0.24 1.20

[16] 0.64 0.42 0.71 0.28 0.87 0.17 1.76 1.75 0.93 0.77 0.33 0.51 0.27 1.19 1.47

[31] 0.15 1.85 0.55 0.08 1.86 0.56 1.18 0.31 0.63 0.87 0.63 0.58 0.31 0.91 1.00

[46] 0.32 0.48 0.46 0.96

A. Find the MLEs of the parameters of **all** possible distributions **using R** and for  $N(\mu, \sigma^2)$ ;

B. Carry out statistical analysis for the MLE of  $P(X \in [2, 4])$  and its SD (you can mimic Examples 2 and 3 (whenever they are appropriate) to determine which is one you think is most appropriate according to the data, based on qqplot, CB and ks.test.