Assignment 2 Template

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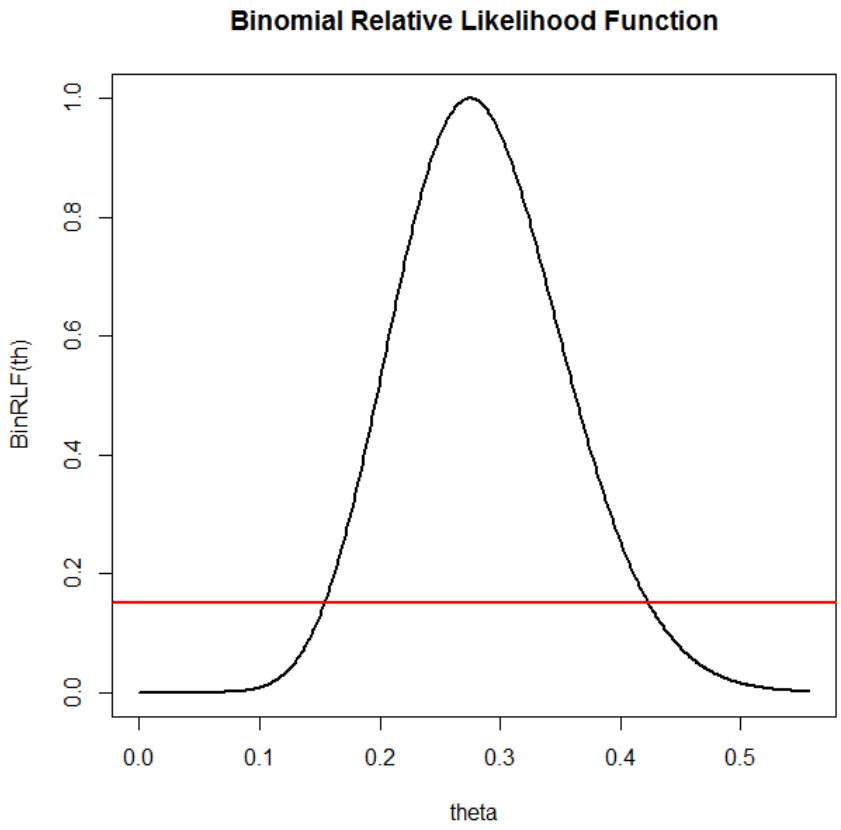
<u>Problem 1:</u> Fill in the information below based on your Binomial observation which was generated using your ID number as the random seed.

theta = 0.3430096 y =11

The maximum likelihood of theta is thetahat = 0.275



Based on the graph of the relative likelihood function and the line y = 0.15 the 15% likelihood interval for theta is: [0.17,0.42]

Using the R function uniroot the 15% likelihood interval is:

[0.1541311,0.4235292]

(NOTE: To find the endpoints of the likelihood interval using
uniroot(function(x) BinRLF(x)-0.15,lower=0.1,upper=0.15)
you will need to change "lower=0.1,upper=0.15" **to values that work for your data.)**

Is theta = 0.2 a plausible value of theta for your data set? Why?

Theta = 0.2 is an plausible value of theta since the corresponding value is greater than 0.1 and less than 0.5 in the graph

Is theta = 0.8 a plausible value of theta for your data set? Why?

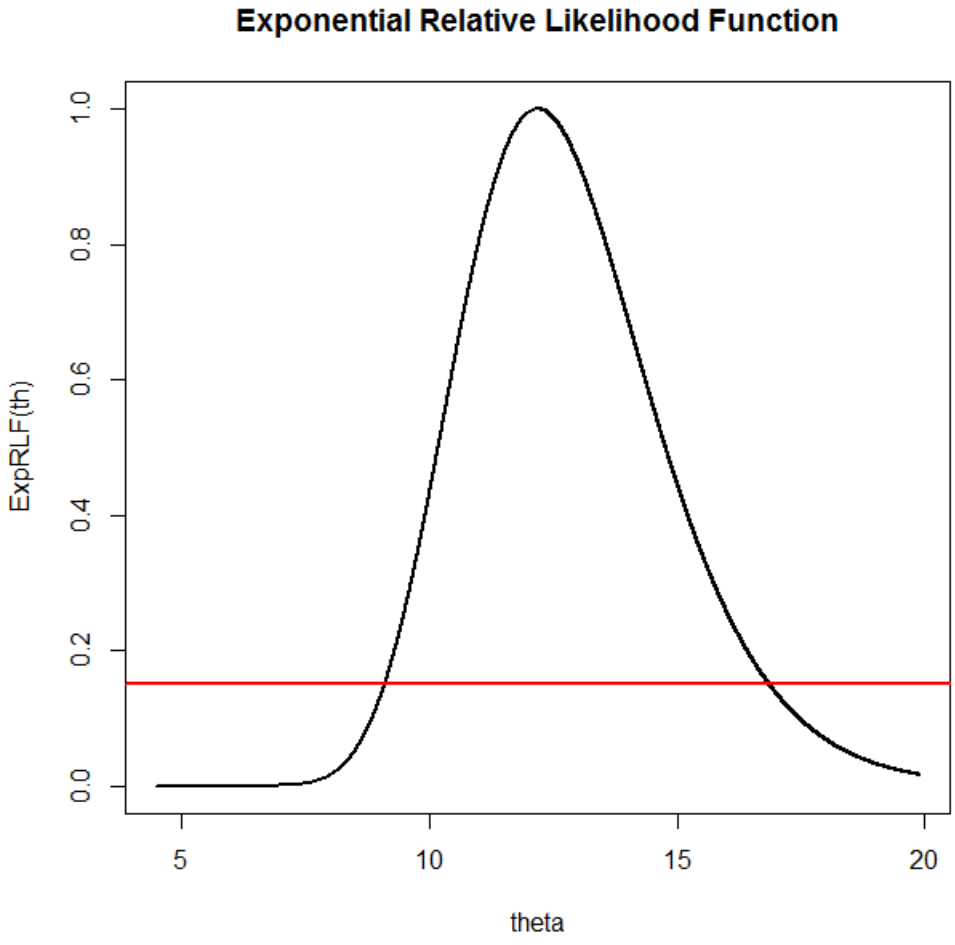
Theta = 0.8 is a very implausible value of theta since it is greater than 0.5, the corresponding value is less than 0.01

<u>Problem 2:</u> The first three numbers in your Exponential data set are:

0.1487426	**0.2557913**	**0.3369800**

theta = 13.68846

The maximum likelihood of theta is thetahat = 12.19222



Based on the graph of the relative likelihood function and the line y = 0.15 the 15% likelihood interval for theta is: [9,17]

Using the R function uniroot the 15% likelihood interval is:

(NOTE: To find the endpoints of the likelihood interval using
uniroot(function(x) ExpRLF(x)-0.15,lower=2.8,upper=3)
you will need to change "lower=2.8,upper=3" **to values that work for your data.)**

[9.096035,16.86836]

Is theta = 2 a plausible value of theta for your data set? Why?

Theta = 2 is a very implausible value of theta since it is less than 5, the corresponding value is less than 0.01

Is theta = 8 a plausible value of theta for your data set? Why?

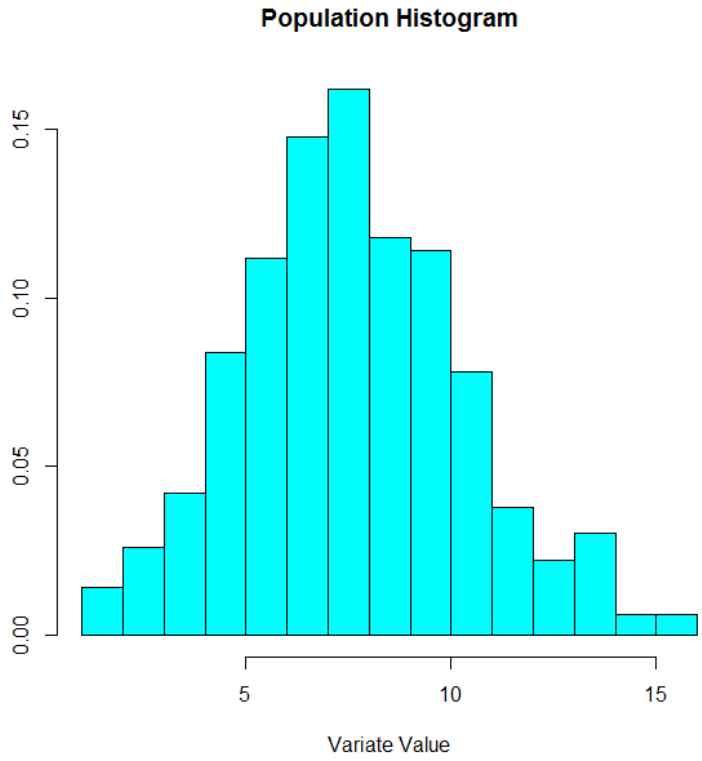
Theta = 8 is an implausible value of theta since the 10% likelihood interval is approximately [8.8,17.5] by using R code, 8 < 8.8, thus it is implausible.

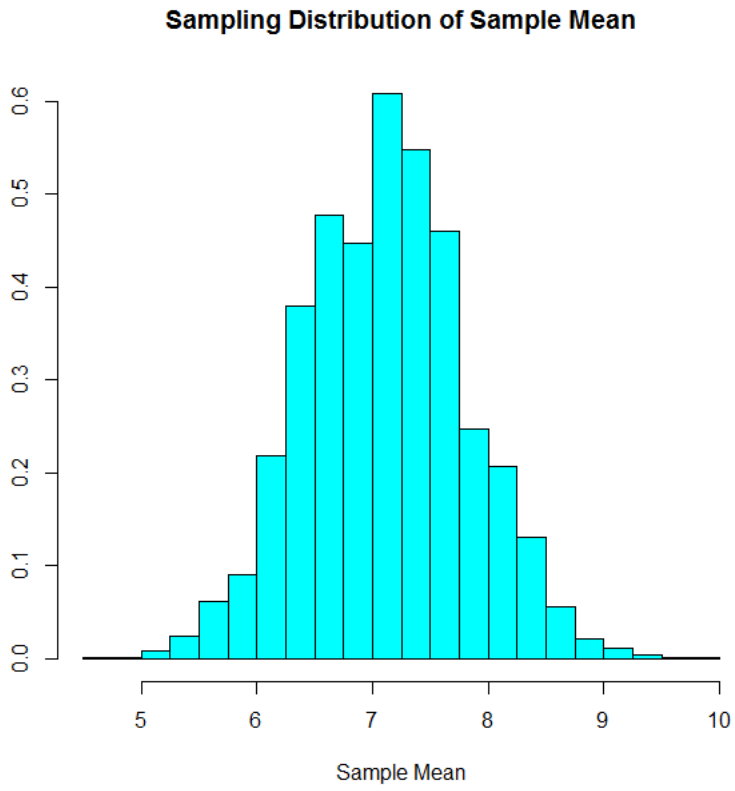
If Y is a new observation from this Exponential distribution then the maximum likelihood estimate of P(Y > 1) is: e^(-12.19222)

Problem 3:

population mean =7.106

population standard deviation = 2.712704





What factor(s) affect the location of the sampling distribution of the sample mean?

The way that the sample is chosen.

What factor(s) affect the spread of the sampling distribution of the sample mean?

The spread of the sampling distribution of the mean decreases as the sample size increases.

What factor(s) affect the shape of the sampling distribution of the sample mean?

The sampling distribution of the mean approaches a normal distribution as sample size increases