

Quiz #7: Solutions

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Create an R-notebook which prints out the answers to the following problems. Knit the Rmd file into a pdf. Upload the pdf of your solutions onto Canvas. All of your work and calculations **must** be done in R.

Problem 1.

The goal of this exercise is to simulate 10,000 values from the exponential distribution using the built-in R commands. Then, you are going to draw a histogram of the simulated values. Finally, you are going to superimpose the graph of the exponential density on top of the histogram.

(1 point) Set the value of the variable `nsim` to be the required number of simulated draws stipulated in the problem statement above.

```
nsim=10000
```

(1 point) Set a particular value of a variable `theta` to be the parameter of the exponential distribution you want to simulate from. The value of the parameter you settle upon is completely up to you.

```
theta=10*pi
theta
## [1] 31.41593
```

(4 points) Set the vector `sims` to contain the `nsim` simulated values from the exponential distribution with the parameter `theta` you defined above. You can use the built-in `rexp` command. Do **not** print out the simulated values.

Be particularly careful about the interpretation of the rate input of the `rexp` command as it relates to the meaning of the parameter `theta` we use in our parametrization of the exponential distribution.

```
sims=rexp(nsim, rate=1/theta)
```

(4 points) Using the command `hist`, plot the histogram of the simulated values. Note that you can alter bin sizes by using `breaks` in the `hist` inputs. Recall that the goal is to superimpose the density curve onto the histogram of simulated values. Hence, you need the histogram with *relative* frequencies. The modification `prob=TRUE` within the `hist` command should come in handy.

(5 points) Using the command `curve`, add the graph of the probability density function of the exponential distribution from which you drew the simulated values. The modification `add=TRUE` within the `curve` command should come in handy.

Caveat: The code for the last two parts of the assignment **must** be in the same R-chunk.

```
hist(sims, breaks=25, col="lavender", prob=TRUE,  
     ylim=c(0,dexp(0,rate=1/theta)),  
     main="Exponential simulations")  
curve(dexp(x,rate=1/theta), col="blue", lwd=2, add=TRUE)
```

