Gama Distr..

2024-03-01

Calls to a customer service line come at an average rate of 1 every 3 minutes. 1. What is the probability that more than an hour elapses before 25 calls come in. 2. What is the 95 percentile for time needed for calls to come in. 3. Simulate waiting times for 5 calls 1000 times. Plot the results.

1-pgamma(60, 25, 1/3)

## [1] 0.8432274

1-pgamma(60,25,scale=3)

## [1] 0.8432274

qgamma(.95,5,1/3)

## [1] 27.46056

time <- rgamma(100, 5, 1/3)  
time

## [1] 9.515717 12.227343 10.561303 10.111452 14.456226 4.233334 13.287662  
## [8] 20.245769 12.497879 8.498137 6.183351 3.820204 30.098409 17.844809  
## [15] 9.289767 16.434335 10.018015 19.662901 7.685480 22.451288 9.861399  
## [22] 10.804246 15.320869 17.032460 18.305904 20.407175 28.545714 27.450578  
## [29] 17.106693 16.056566 14.570715 27.779625 7.646163 15.382530 15.315895  
## [36] 13.525268 6.434922 43.616760 30.789954 16.314271 23.839178 15.384114  
## [43] 8.313357 6.682589 15.803007 15.567325 9.131812 15.503845 13.121299  
## [50] 12.969059 13.537597 20.143490 13.479542 26.178026 8.037122 13.164622  
## [57] 15.714476 14.808961 5.939173 16.804231 14.915493 13.892093 9.242838  
## [64] 12.286739 20.009695 17.235979 13.548471 26.358787 13.423762 13.086278  
## [71] 32.660724 24.324008 11.451808 29.342672 13.311446 15.165102 21.424967  
## [78] 23.761933 20.423231 8.365559 6.879163 13.035038 11.020268 17.344900  
## [85] 14.442101 21.206722 9.565012 11.950559 5.621170 15.163155 7.796682  
## [92] 15.427646 14.580774 3.424213 27.907957 4.680183 14.308491 17.838105  
## [99] 9.372879 11.411942

library(tidyverse)

## ── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0 ──  
## ✔ dplyr 1.1.4 ✔ readr 2.1.5  
## ✔ forcats 1.0.0 ✔ stringr 1.5.1  
## ✔ ggplot2 3.4.4 ✔ tibble 3.2.1  
## ✔ lubridate 1.9.3 ✔ tidyr 1.3.0  
## ✔ purrr 1.0.2   
## ── Conflicts ────────────────────────────────────────── tidyverse\_conflicts() ──  
## ✖ dplyr::filter() masks stats::filter()  
## ✖ dplyr::lag() masks stats::lag()  
## ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors

qplot(time,col="yellow", bins=50, xlabel="waiting time"+ geom\_violin(xintercept=27) )

## Warning: `qplot()` was deprecated in ggplot2 3.4.0.  
## This warning is displayed once every 8 hours.  
## Call `lifecycle::last\_lifecycle\_warnings()` to see where this warning was  
## generated.

## Warning in geom\_violin(xintercept = 27): Ignoring unknown parameters:  
## `xintercept`

## Warning in geom\_histogram(bins = 50, xlabel = NULL): Ignoring unknown  
## parameters: `xlabel`

