006-Sensitivity Analysis of One Paramter

Central Limit Theorem

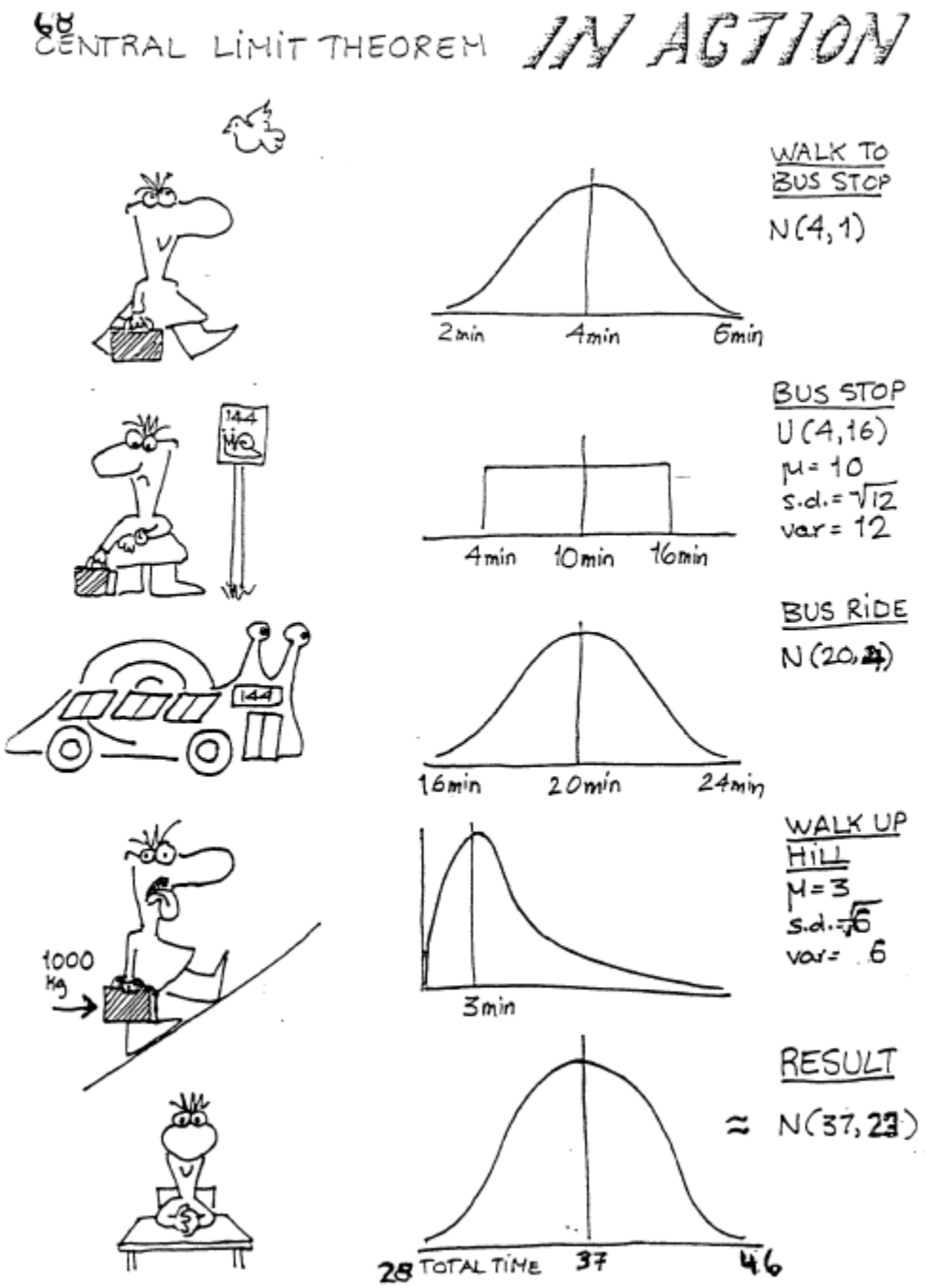
June 1, 2015

Abstract

Often in statistics, we are required to perform sensitivity analyses to see the effect of parameters on inference. Here I provide a simple illustration of performing such a task in an efficient and reproducible way using the function `knitr::knit_expand` (Xie, 2015, 2013, 2014). We use the demonstration of the Central Limit Theorem (CLT) in action (Joseph, 2010) as an example.

Contents

1 Lawrence Joseph's Trip to Purvis Hall



2 Proof of CLT in Action with R and knitr::knit_expand

2.1 $n = 10$

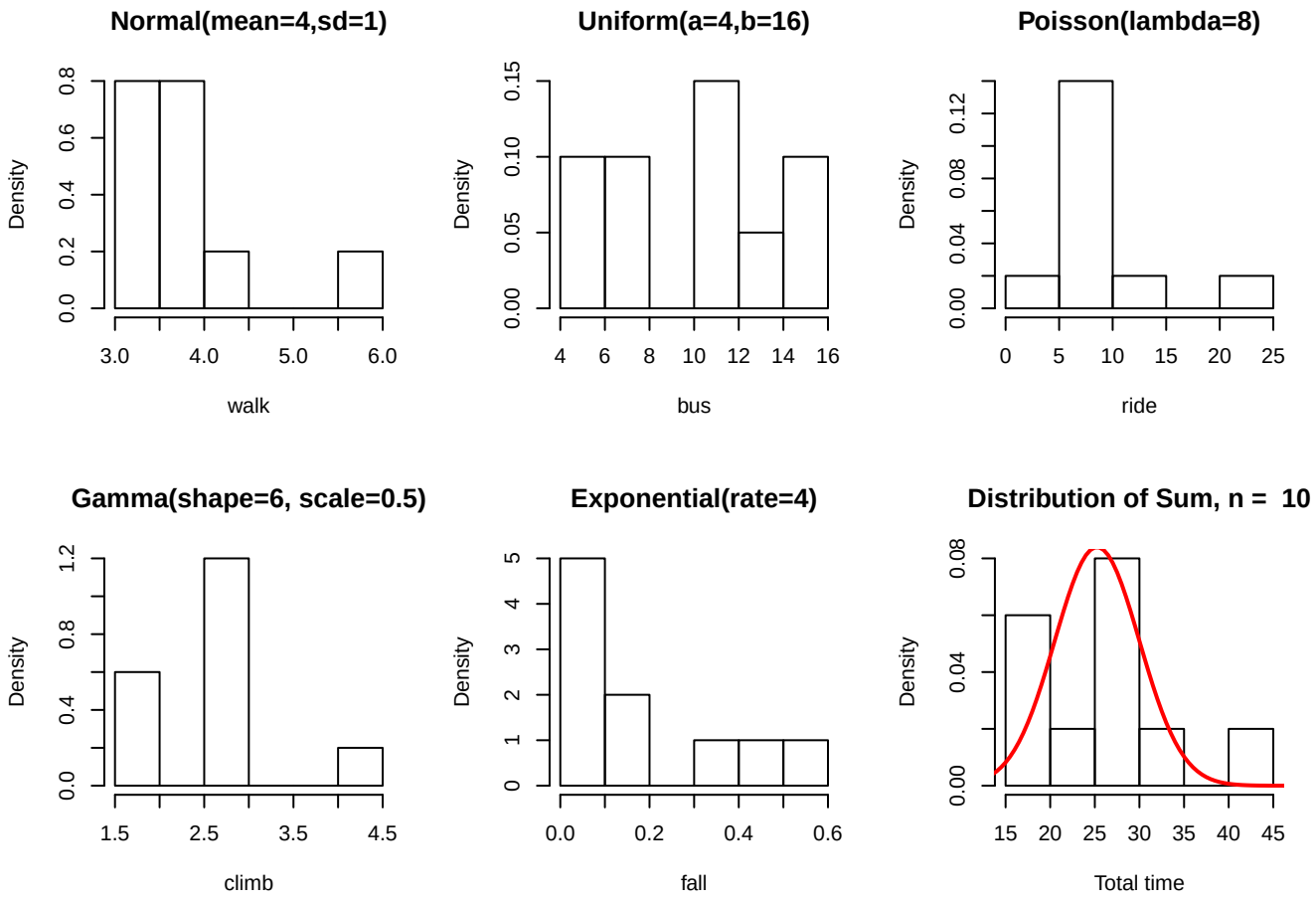


Figure 1: CLT in Action with $n = 10$

2.2 $n = 110$

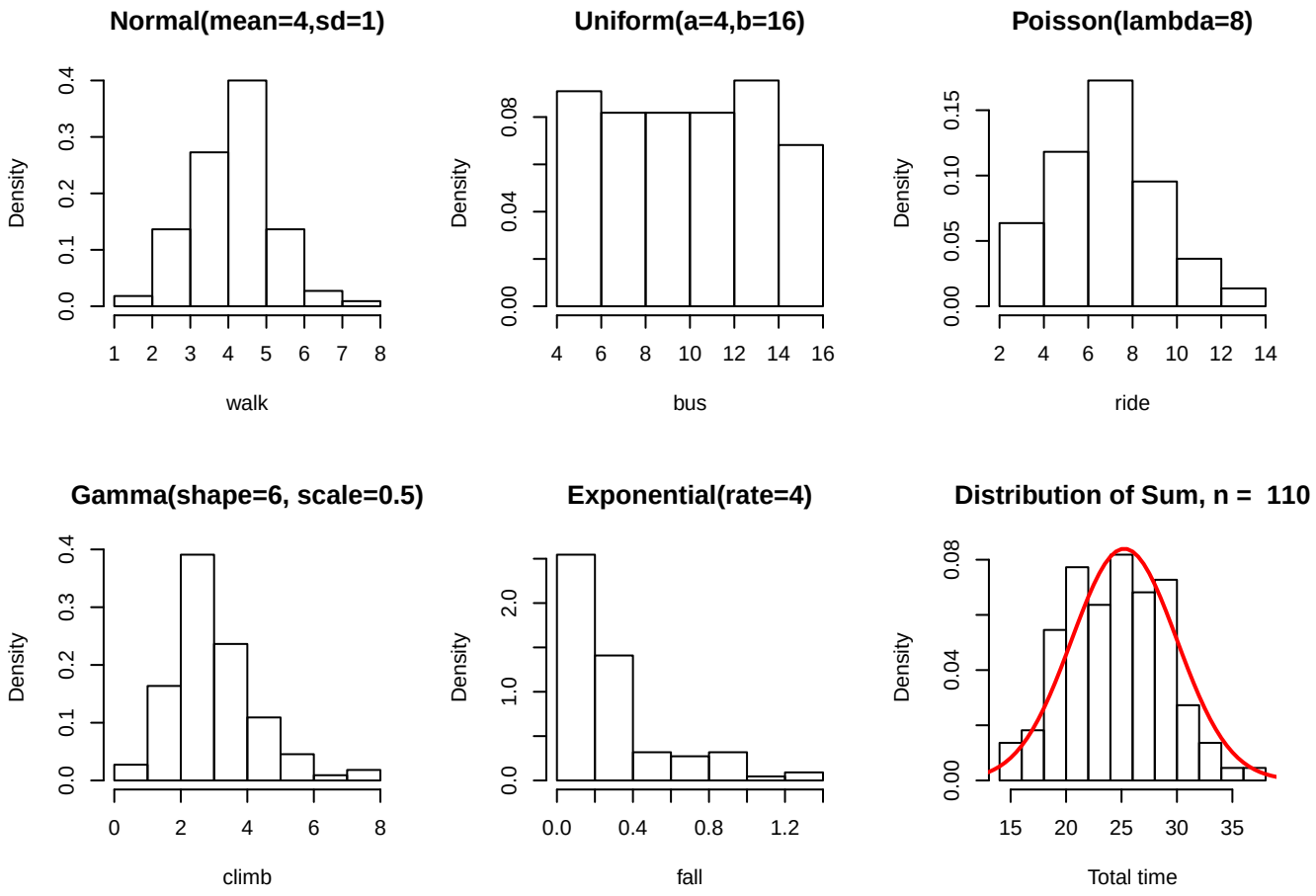


Figure 2: CLT in Action with $n = 110$

2.3 $n = 210$

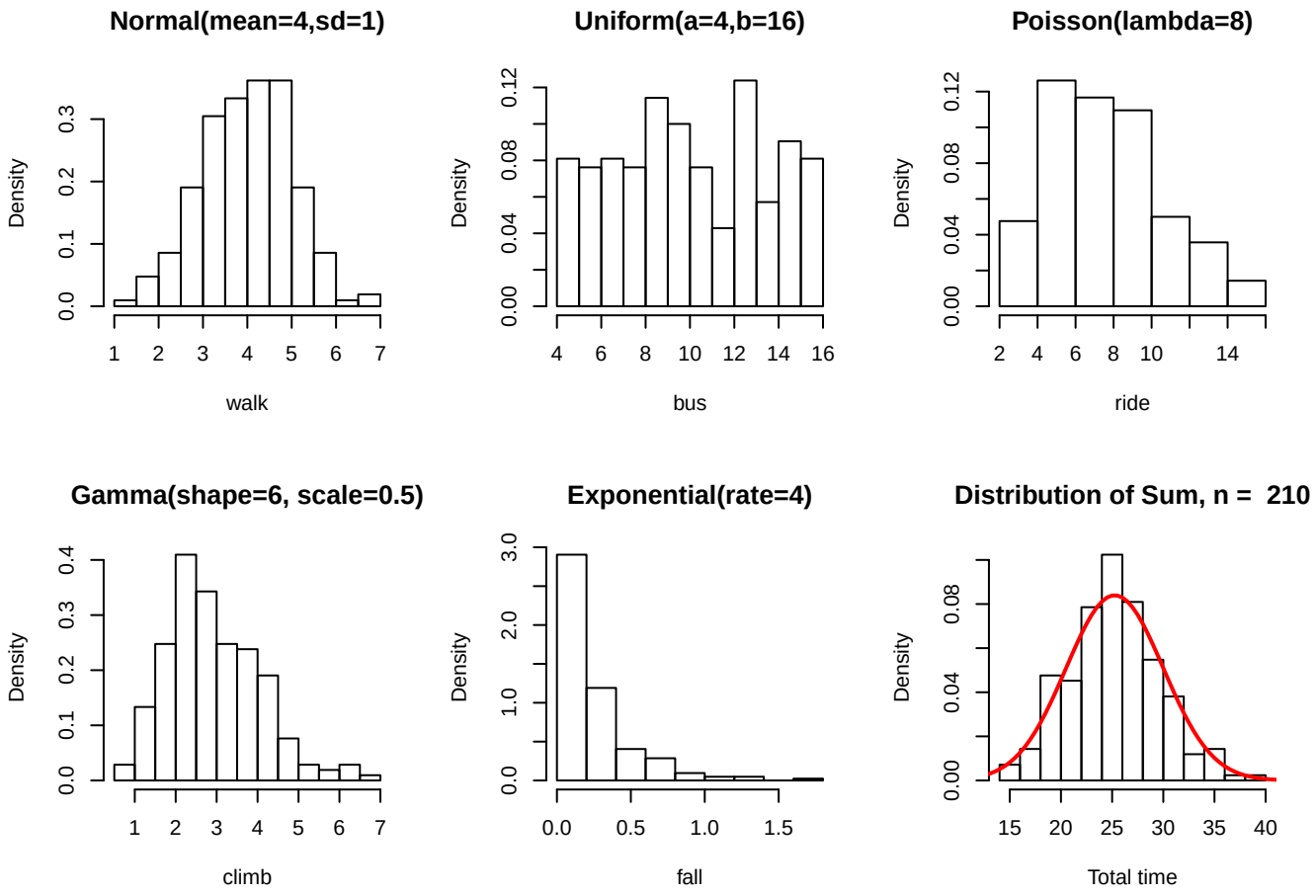


Figure 3: CLT in Action with $n = 210$

2.4 $n = 310$

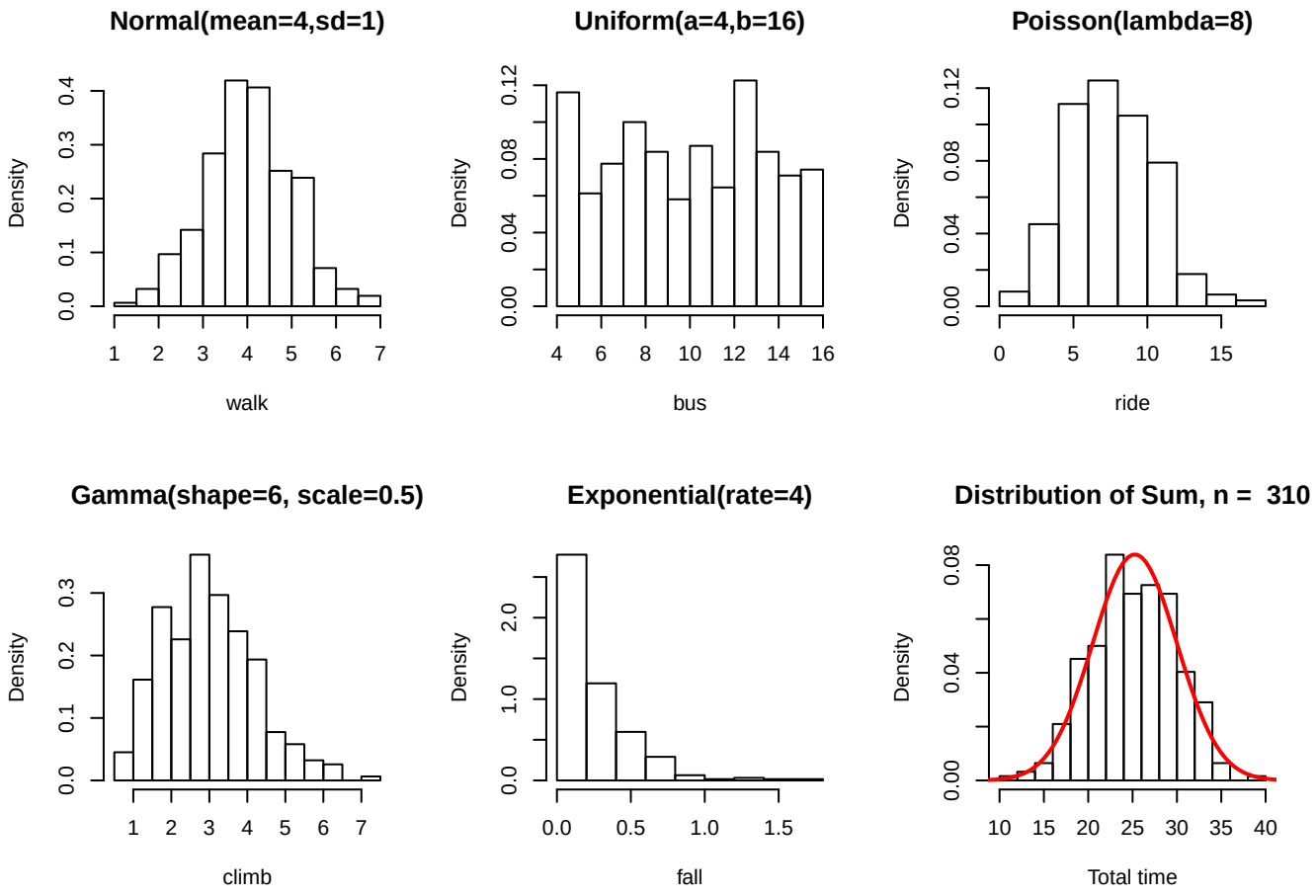


Figure 4: CLT in Action with $n = 310$

2.5 $n = 410$

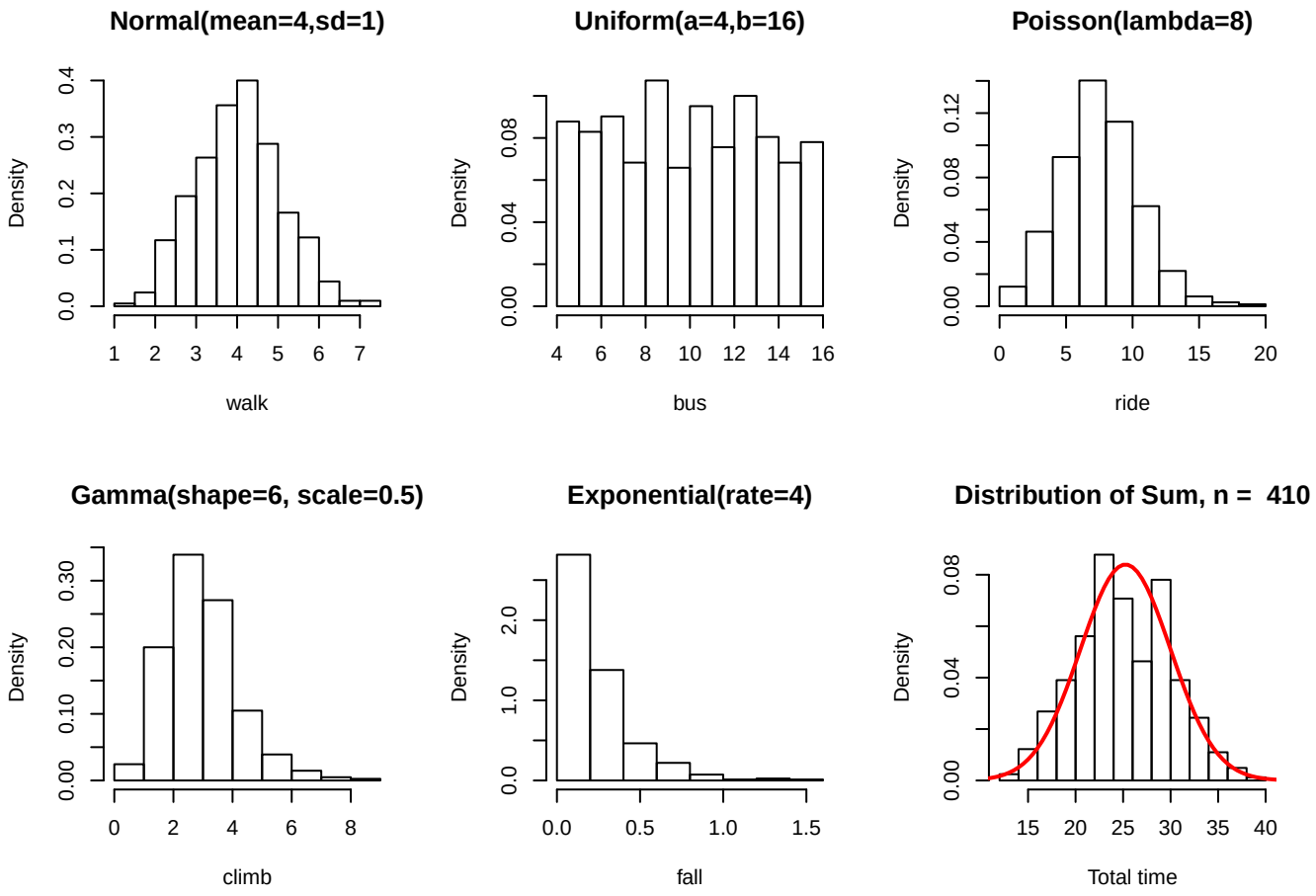


Figure 5: CLT in Action with $n = 410$

2.6 $n = 510$

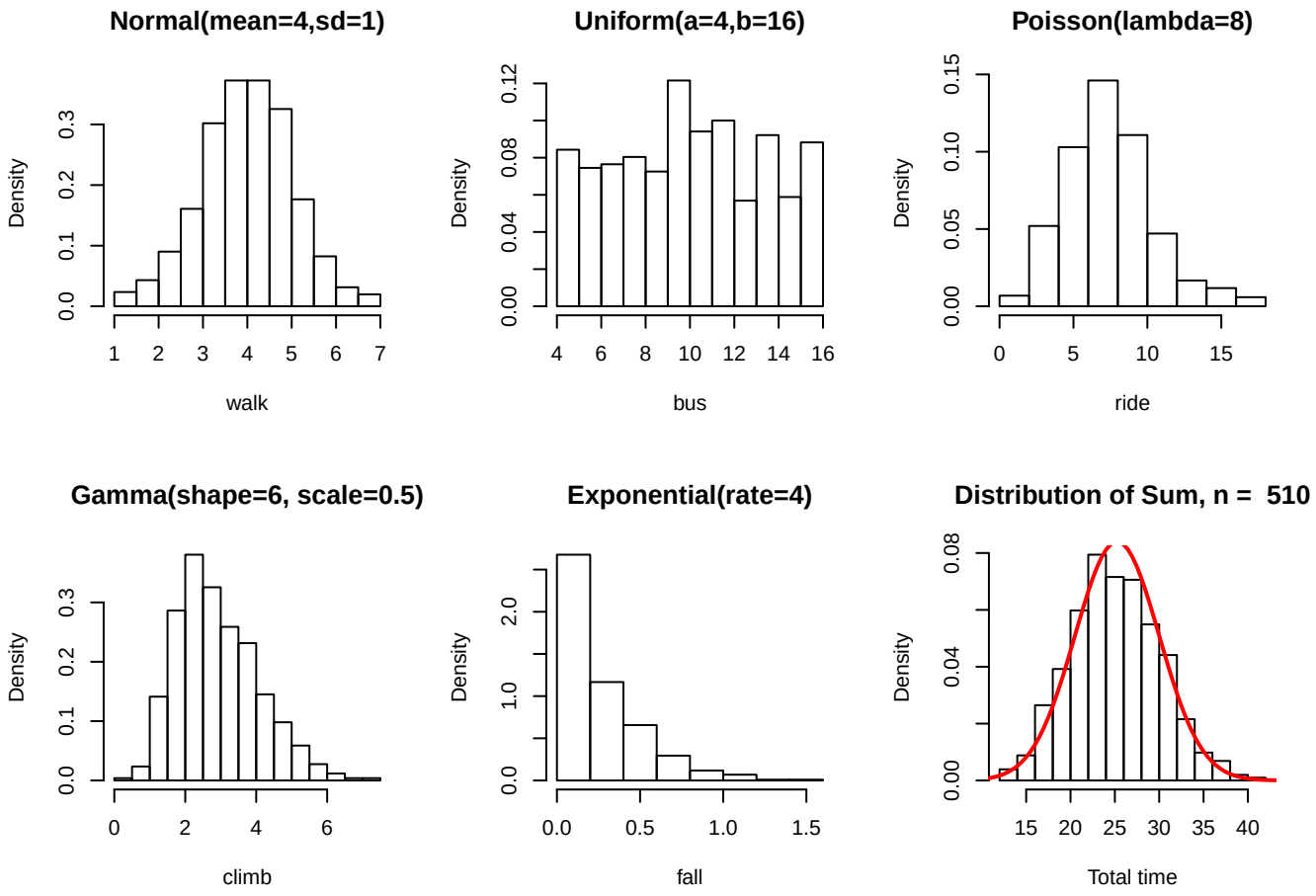


Figure 6: CLT in Action with $n = 510$

2.7 $n = 610$

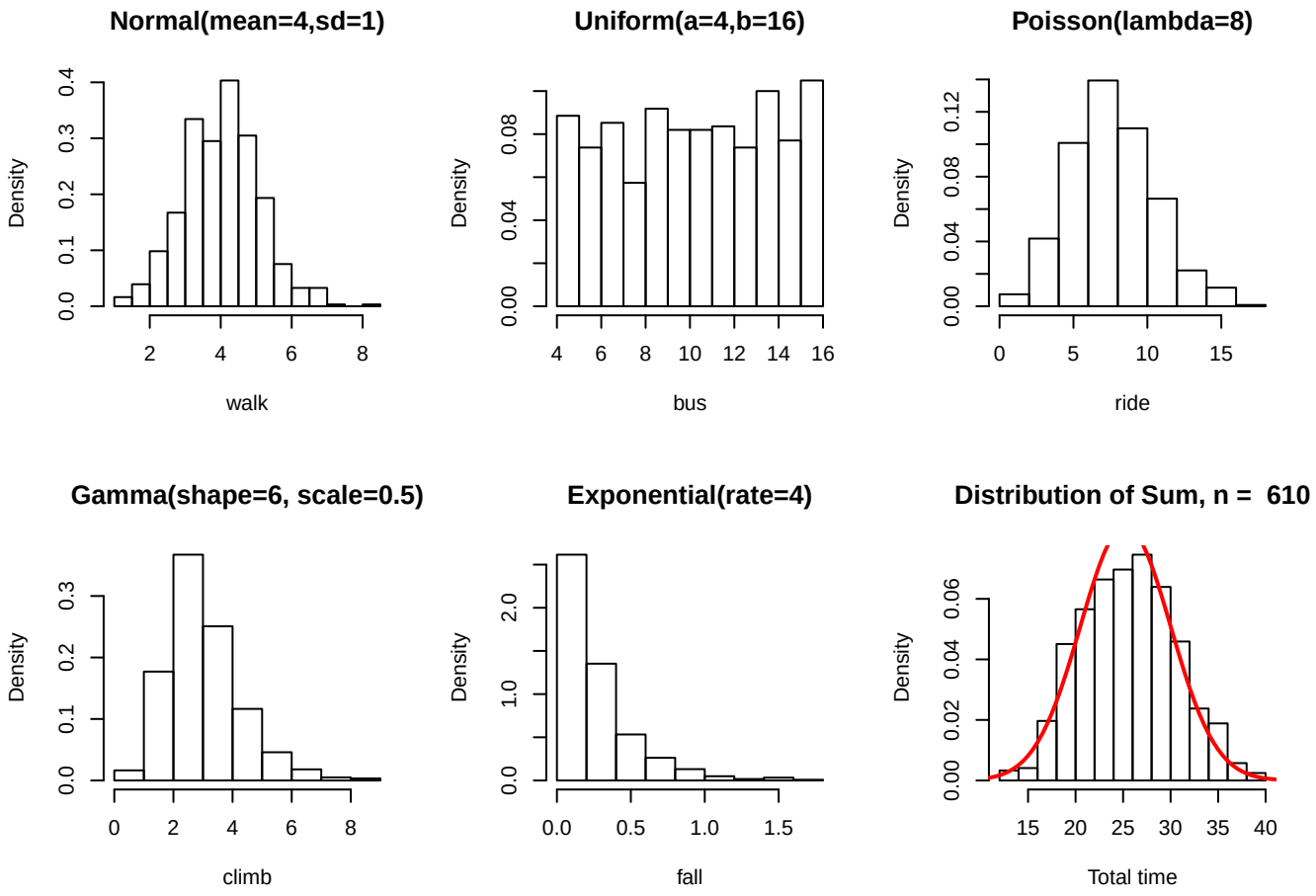


Figure 7: CLT in Action with $n = 610$

2.8 $n = 710$

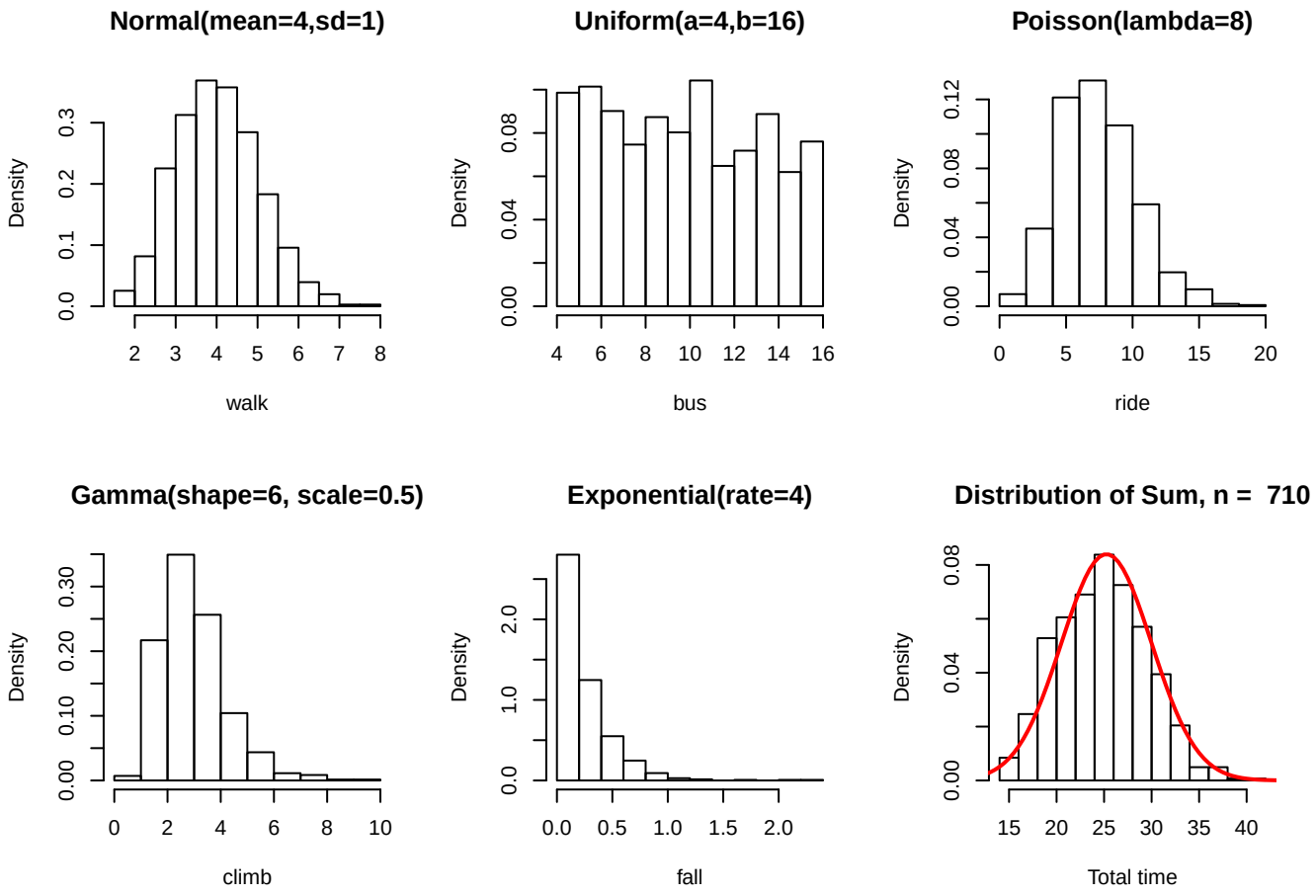


Figure 8: CLT in Action with $n = 710$

2.9 $n = 810$

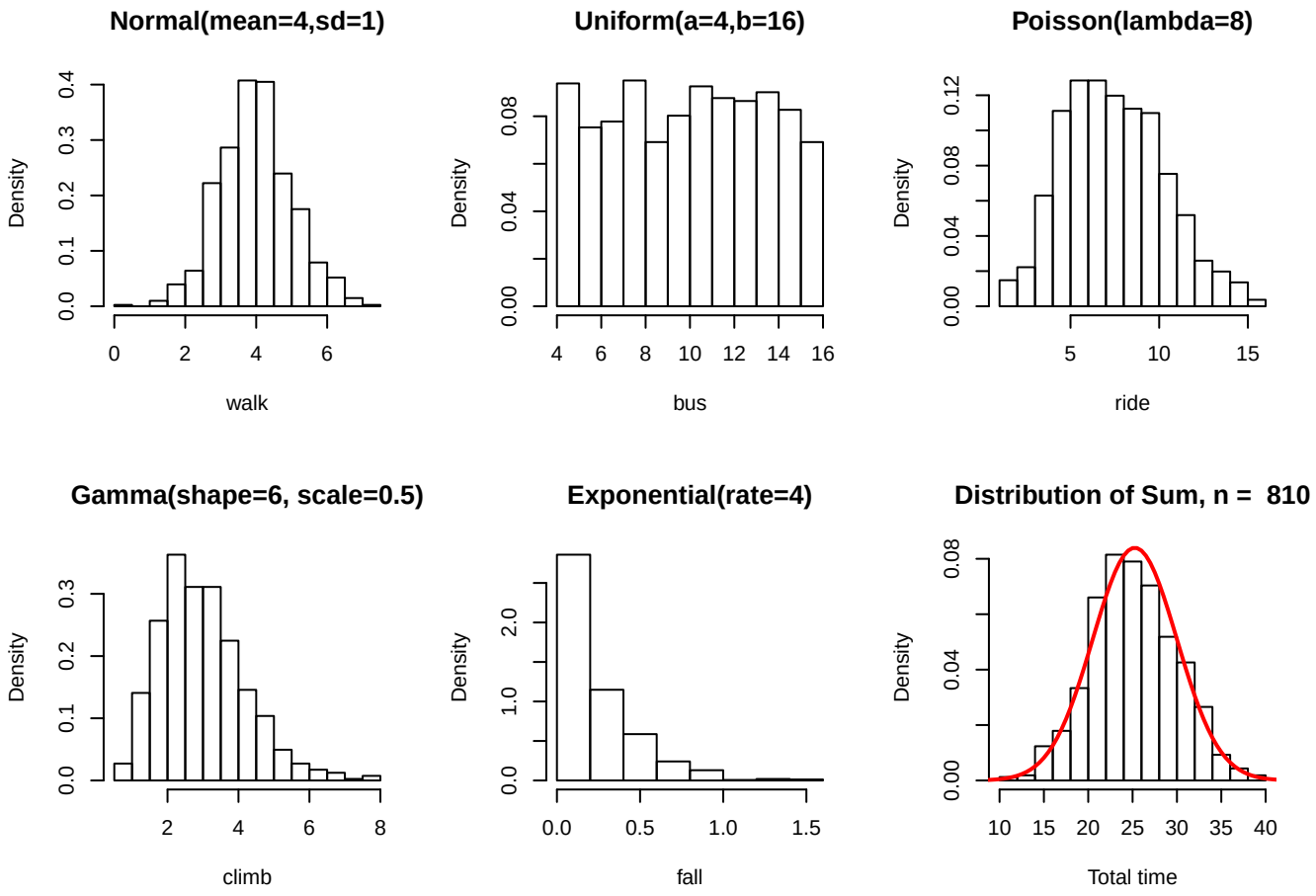


Figure 9: CLT in Action with $n = 810$

2.10 $n = 910$

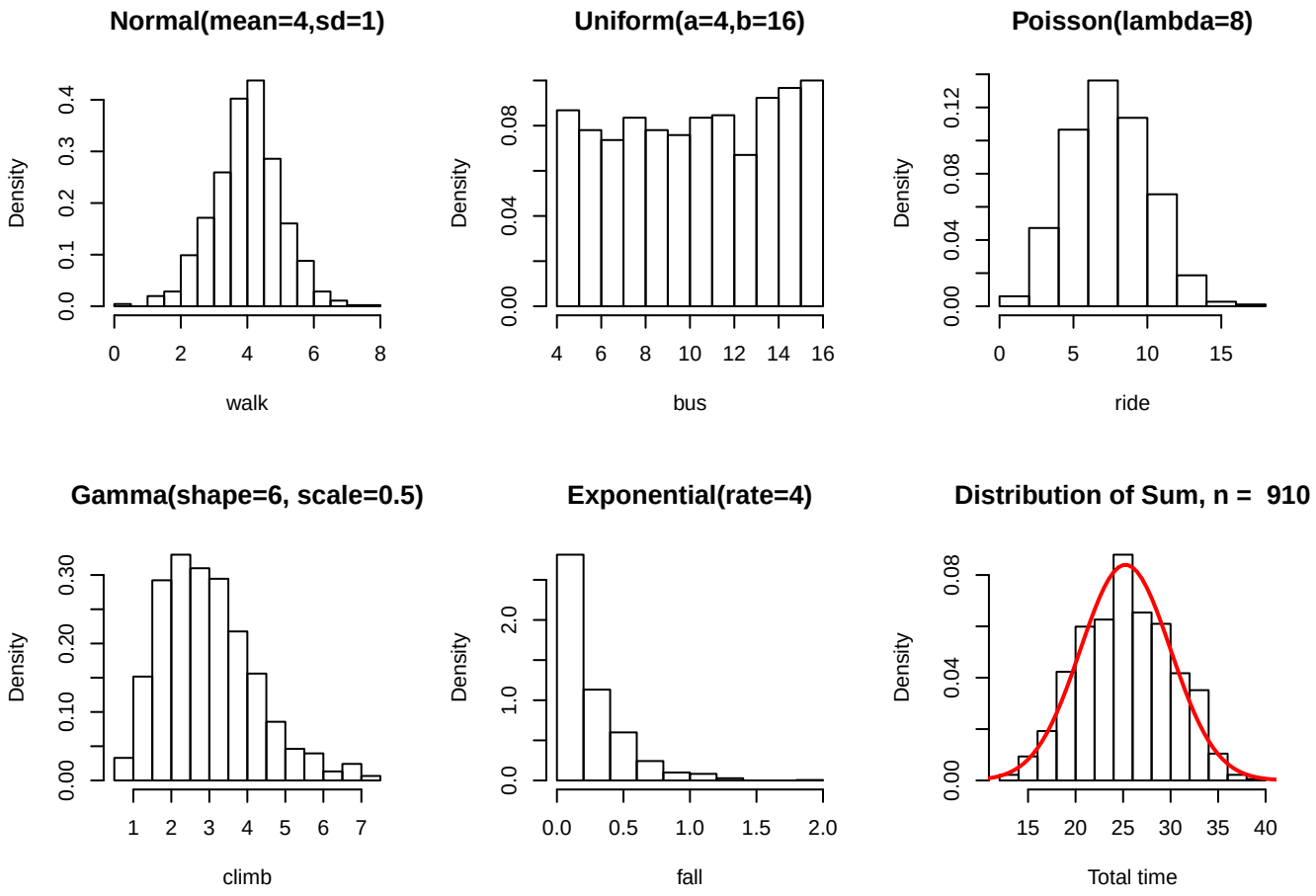


Figure 10: CLT in Action with $n = 910$

2.11 $n = 1010$

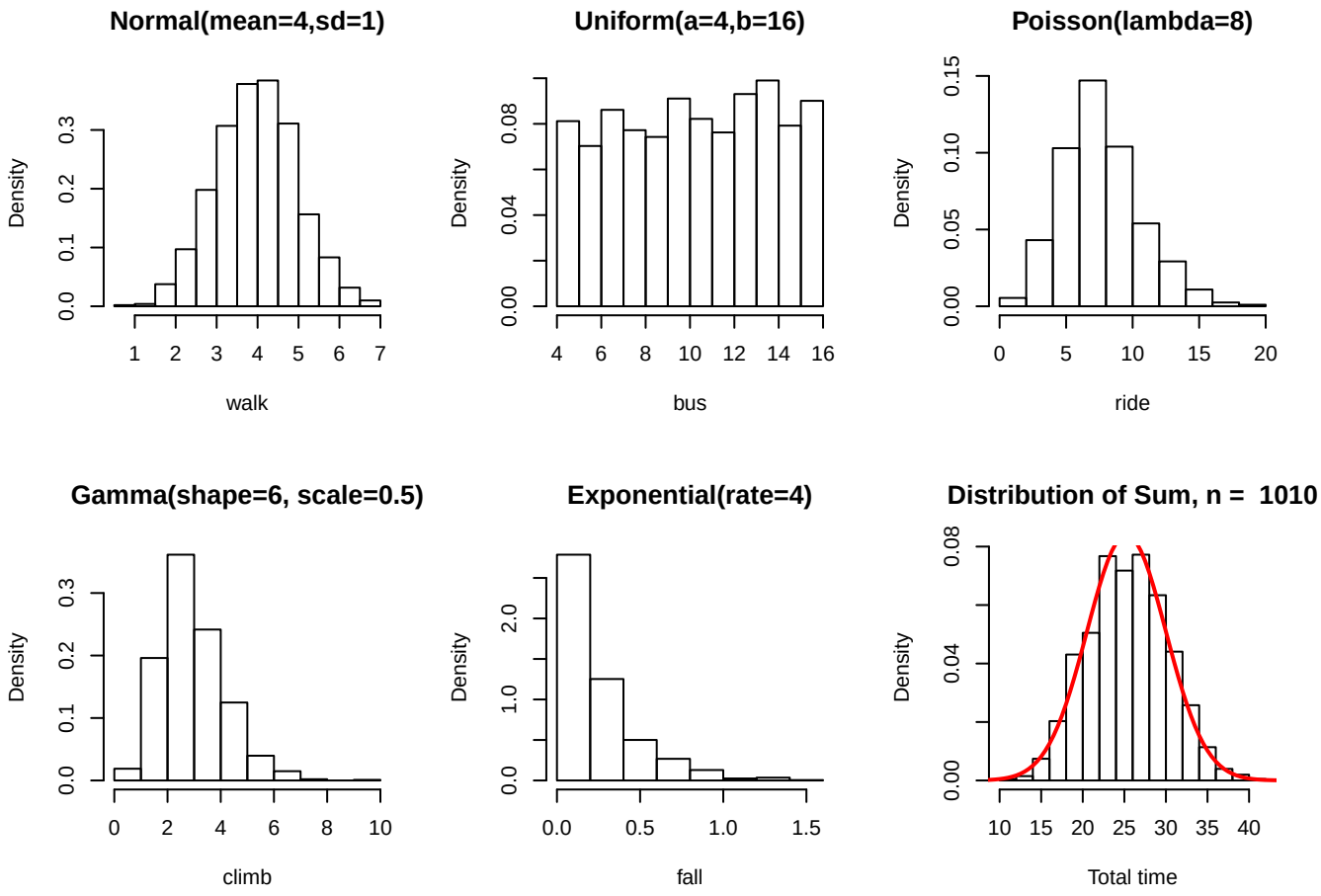


Figure 11: CLT in Action with $n = 1010$

2.12 $n = 1110$

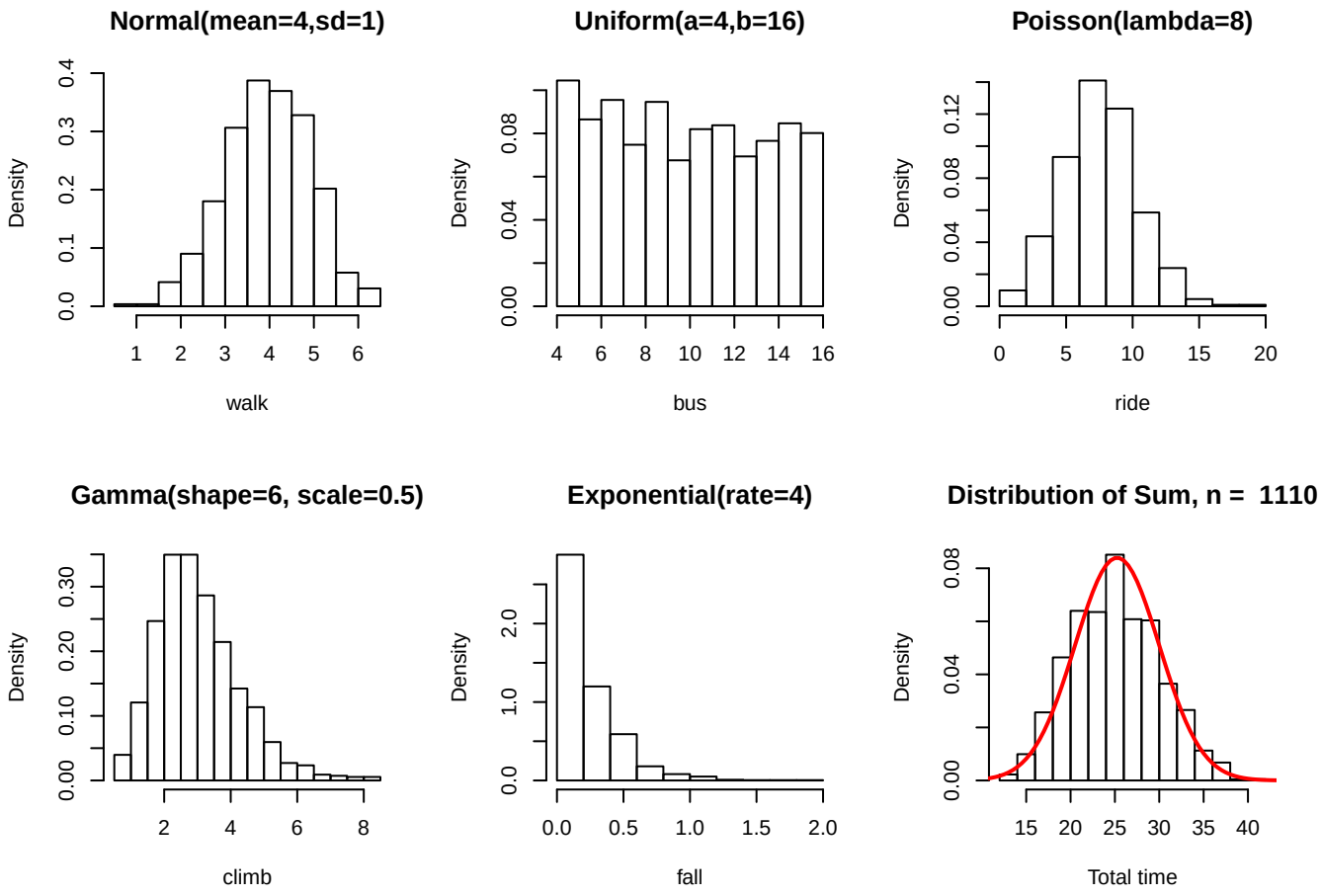


Figure 12: CLT in Action with $n = 1110$

2.13 $n = 1210$

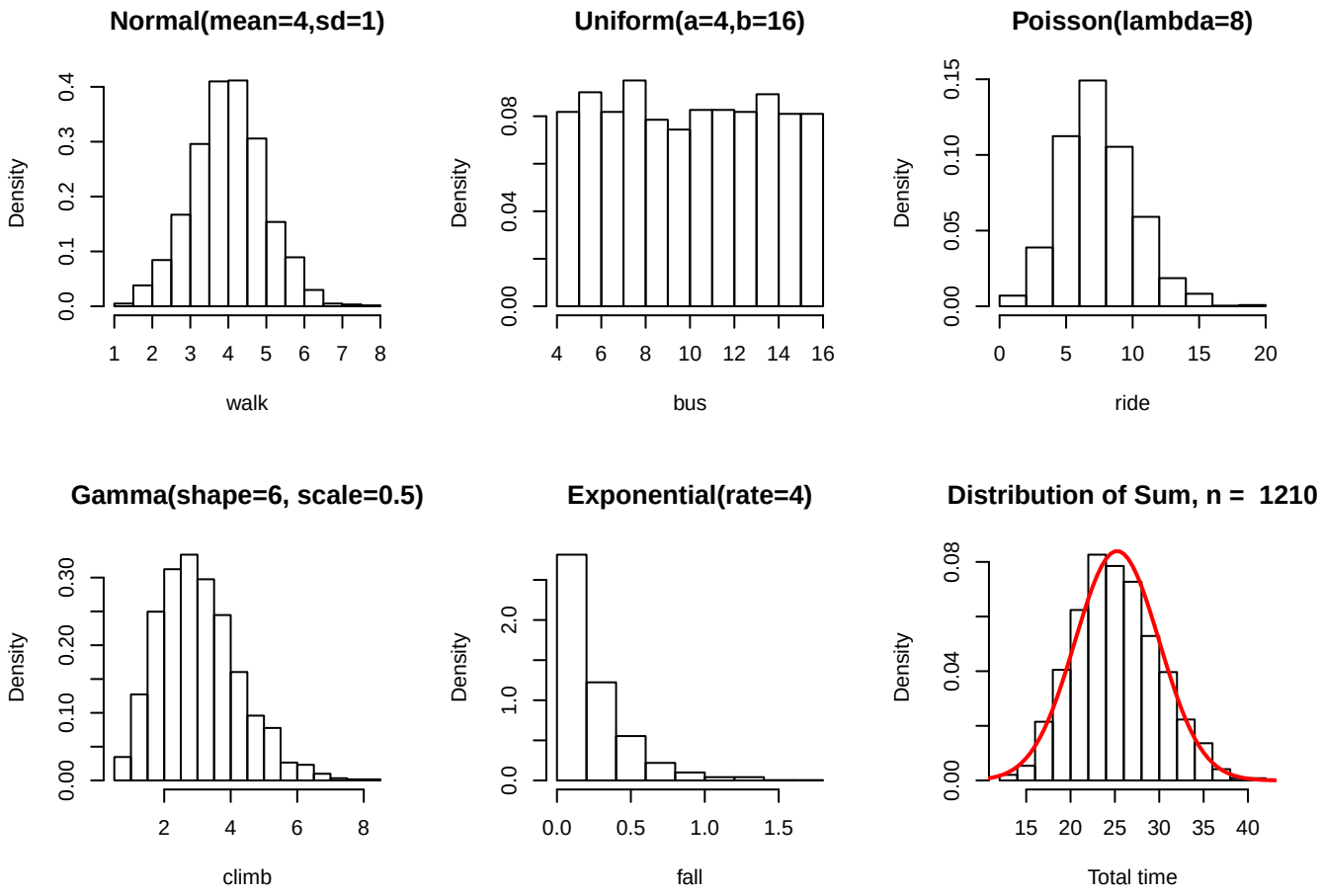


Figure 13: CLT in Action with $n = 1210$

2.14 $n = 1310$

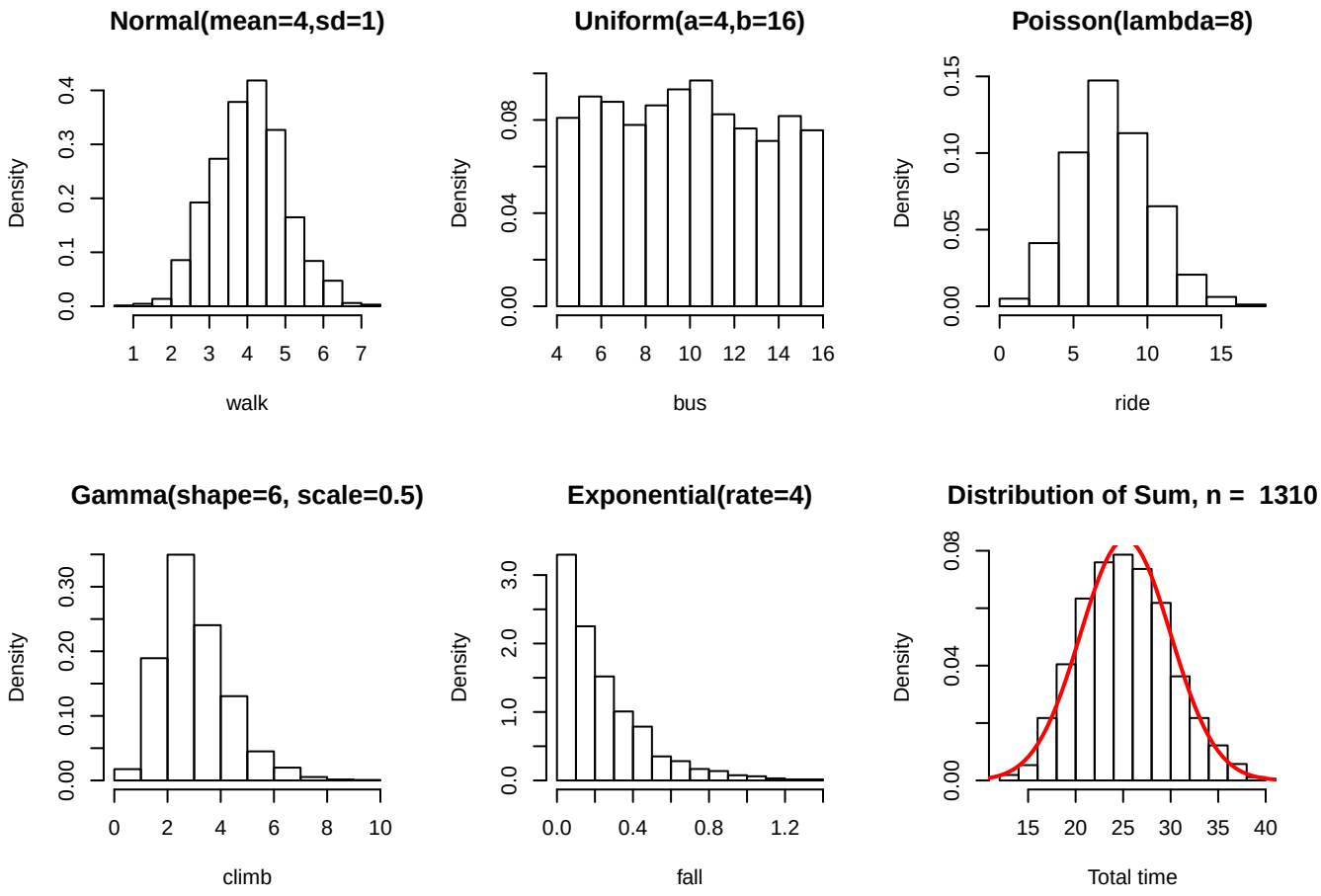


Figure 14: CLT in Action with $n = 1310$

2.15 $n = 1410$

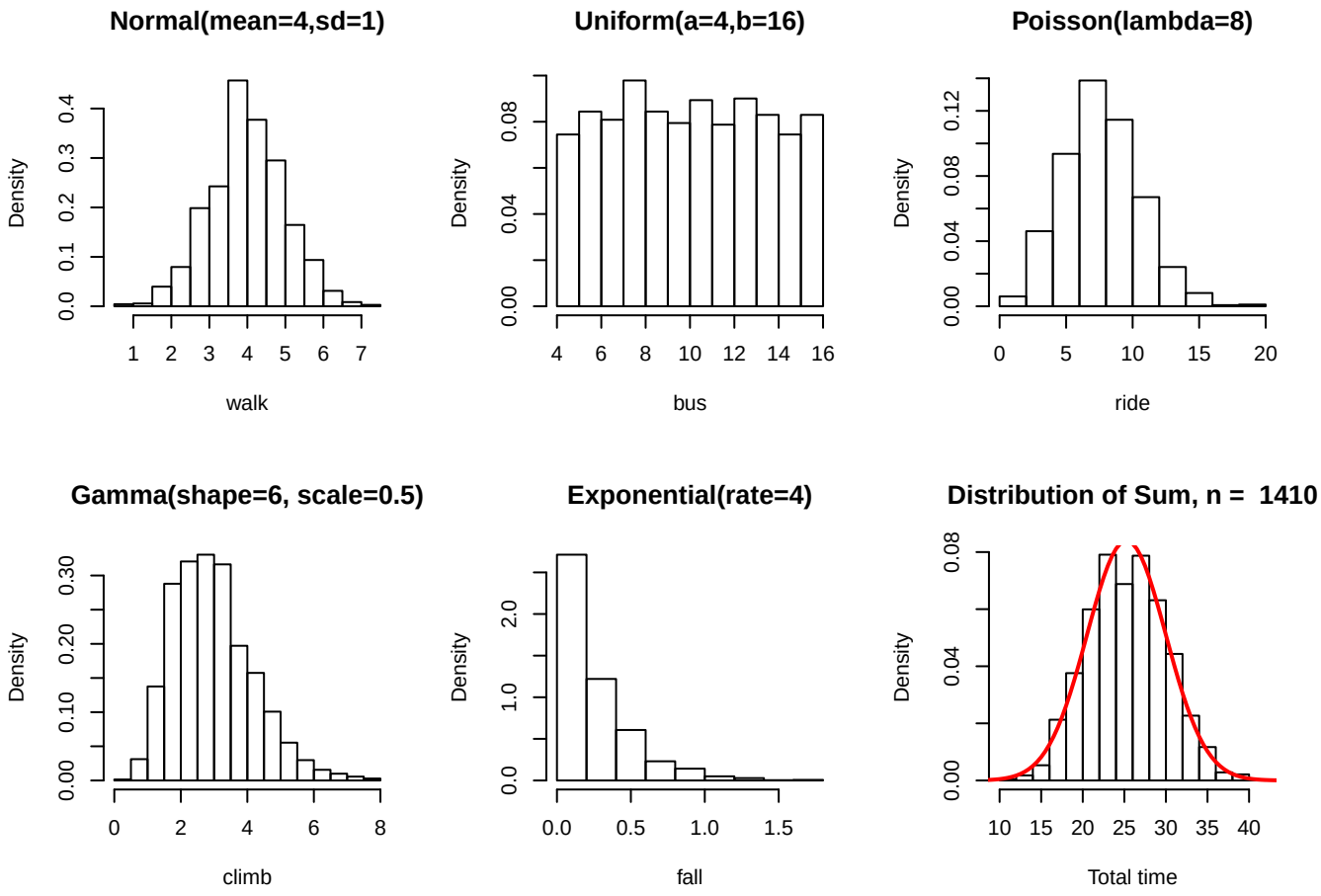


Figure 15: CLT in Action with $n = 1410$

2.16 $n = 1510$

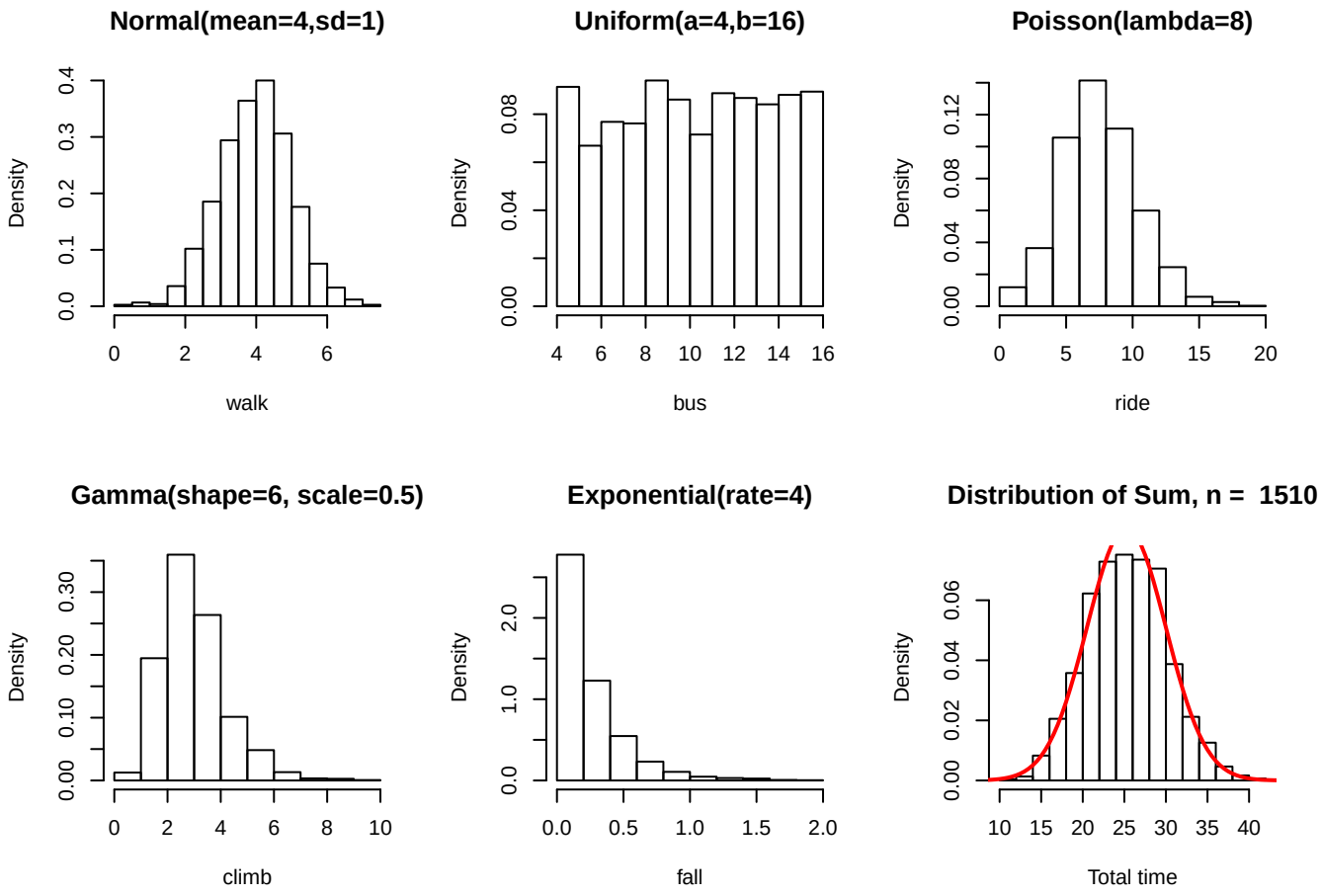


Figure 16: CLT in Action with $n = 1510$

2.17 $n = 1610$

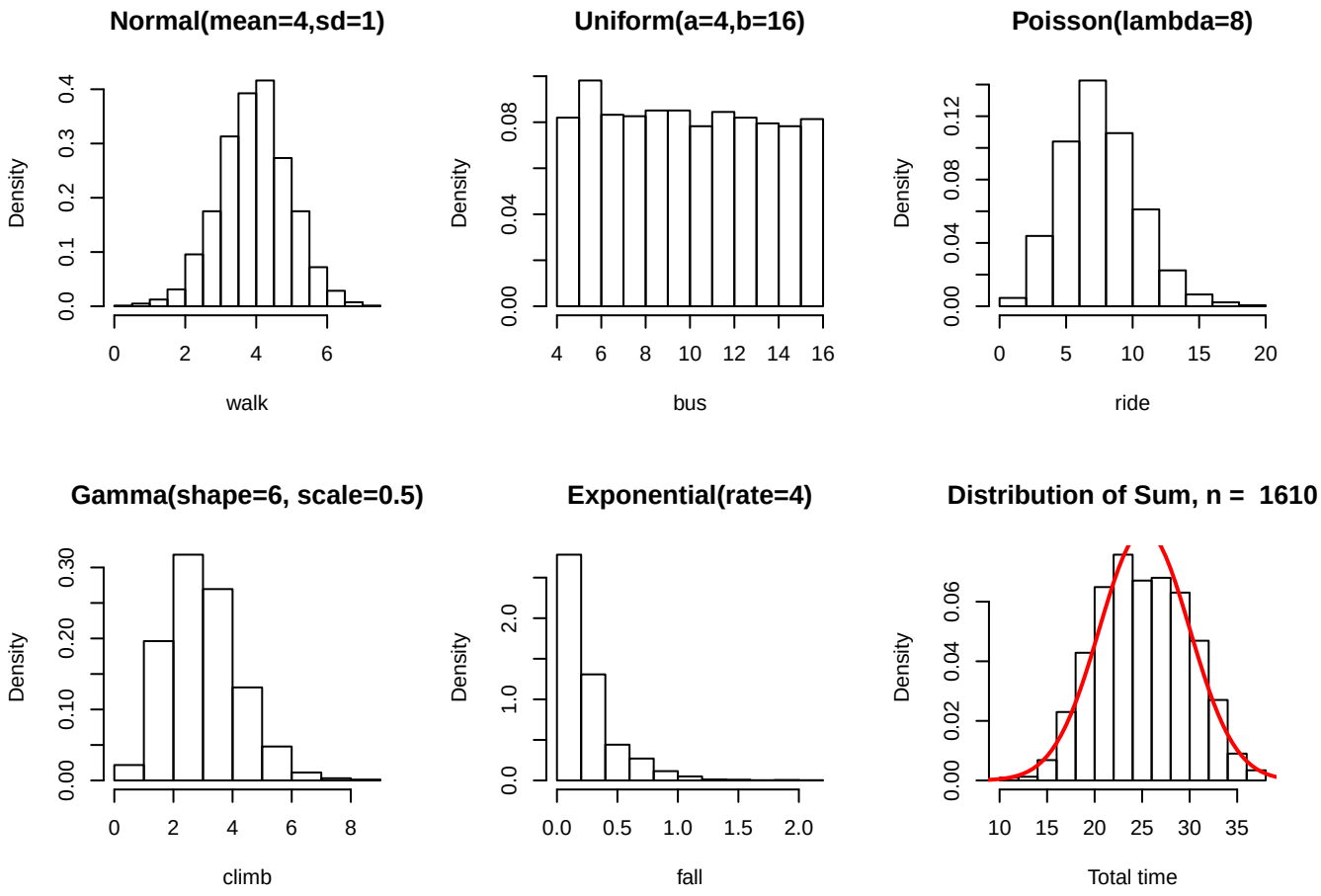


Figure 17: CLT in Action with $n = 1610$

2.18 $n = 1710$

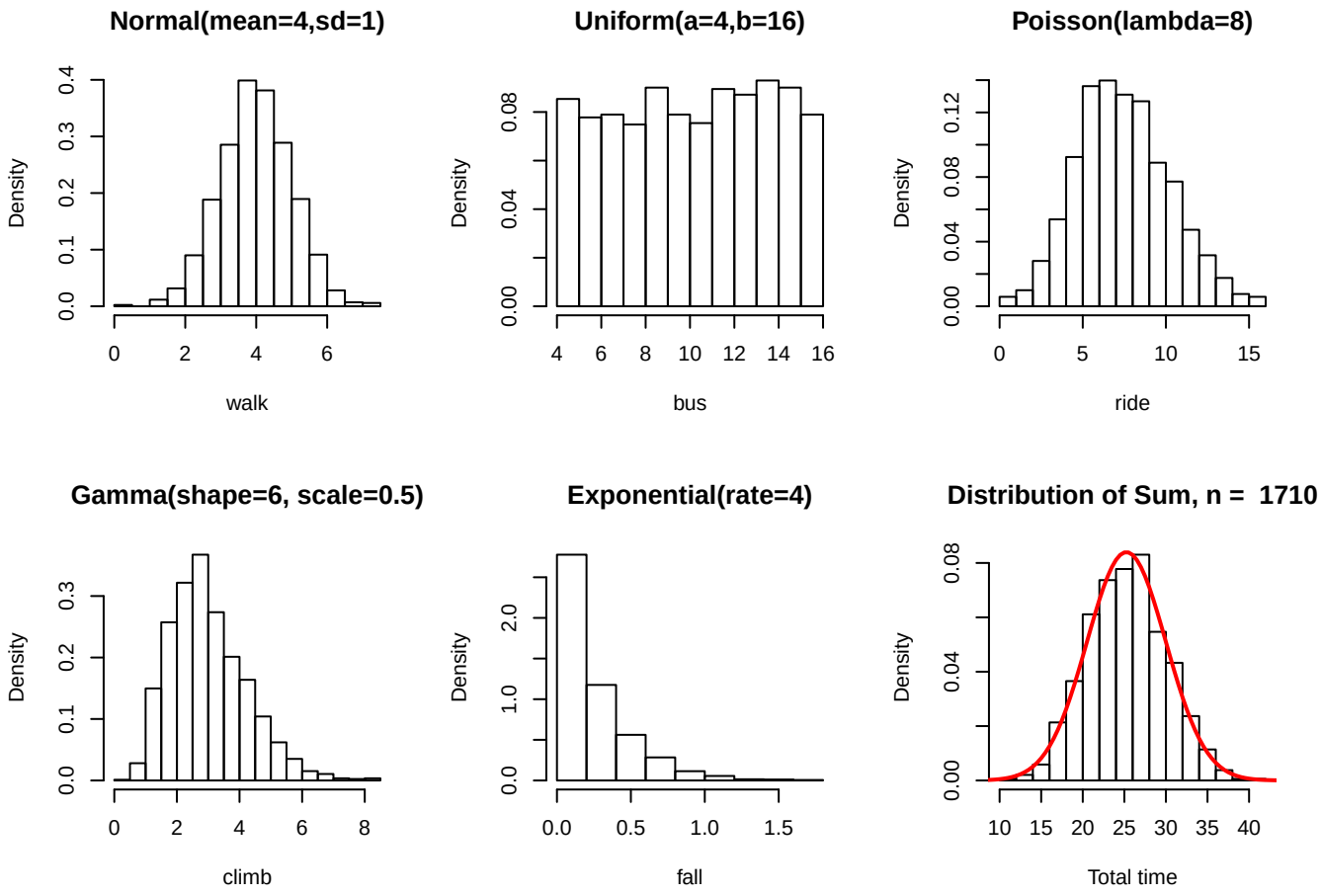


Figure 18: CLT in Action with $n = 1710$

2.19 $n = 1810$

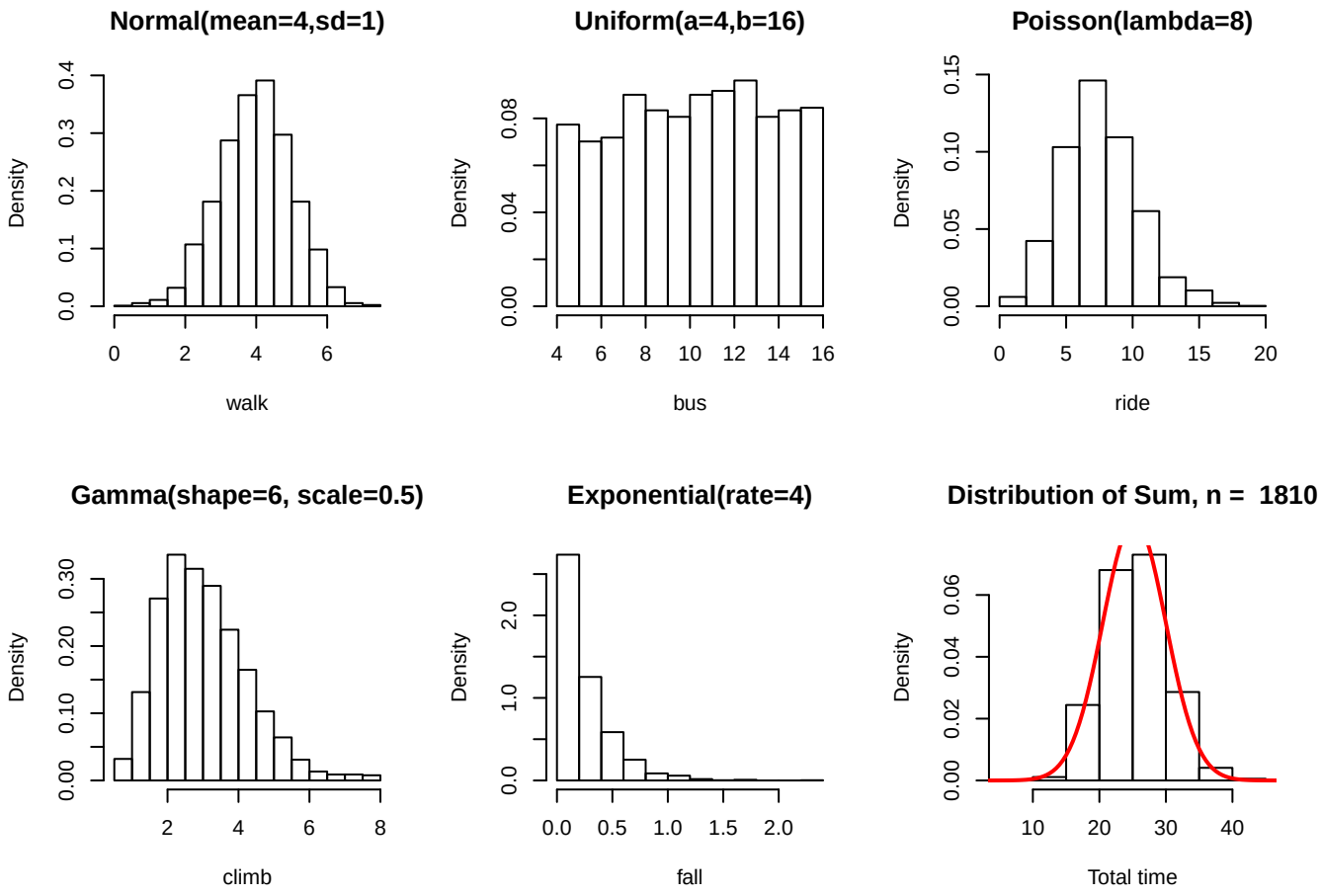


Figure 19: CLT in Action with $n = 1810$

2.20 $n = 1910$

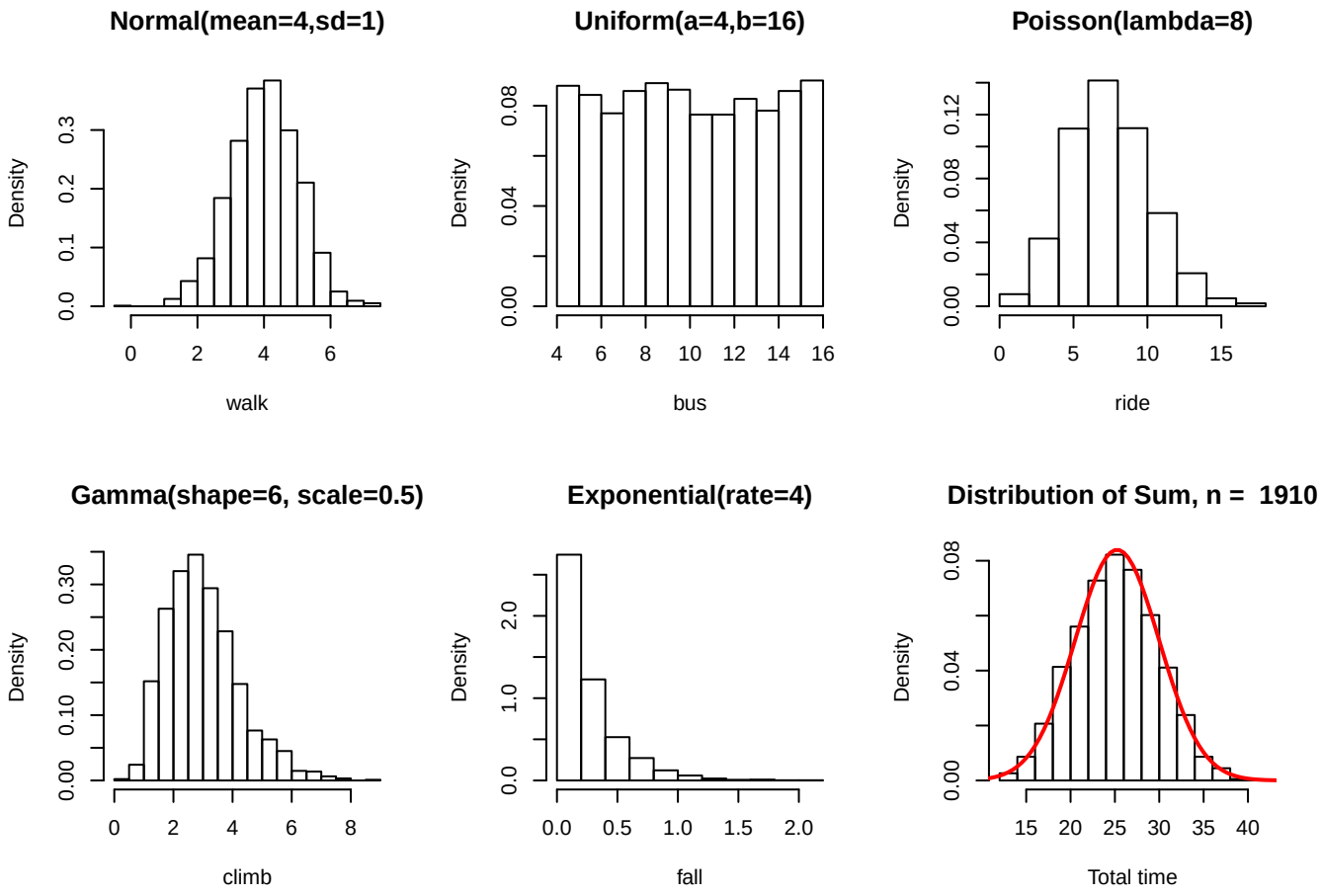


Figure 20: CLT in Action with $n = 1910$

2.21 $n = 2010$

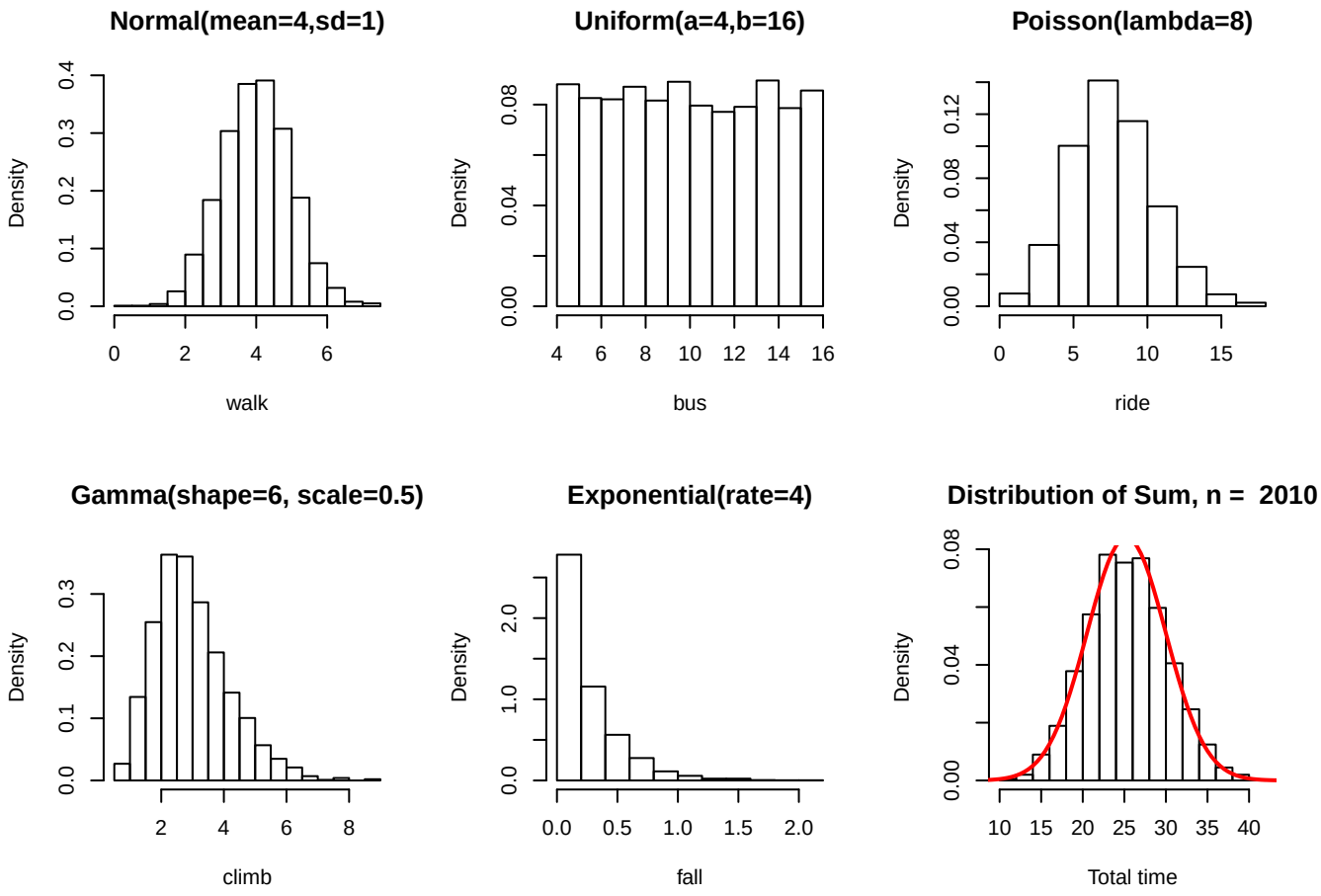


Figure 21: CLT in Action with $n = 2010$

References

Lawrence Joseph. *Principles of Inferential Statistics in Medicine*, 2010. URL http://www.medicine.mcgill.ca/epidemiology/Joseph/courses/EPIB-607/notes.pdf. EPIB 607. 1

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Yihui Xie. knitr: A comprehensive tool for reproducible research in R. In Victoria Stodden, Friedrich Leisch, and Roger D. Peng, editors, *Implementing Reproducible Computational Research*. Chapman and Hall/CRC, 2014. URL http://www.crcpress.com/product/isbn/9781466561595. ISBN 978-1466561595. 1

Yihui Xie. *knitr: A General-Purpose Package for Dynamic Report Generation in R*, 2015. URL http://yihui.name/knitr/. R package version 1.10.5. 1

A Session Information

```
sessionInfo()
```

```
## R version 3.2.0 (2015-04-16)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Ubuntu 14.04 LTS
##
## locale:
##  [1] LC_CTYPE=en_CA.UTF-8       LC_NUMERIC=C
##  [3] LC_TIME=en_CA.UTF-8        LC_COLLATE=en_CA.UTF-8
##  [5] LC_MONETARY=en_CA.UTF-8    LC_MESSAGES=en_CA.UTF-8
##  [7] LC_PAPER=en_CA.UTF-8       LC_NAME=C
##  [9] LC_ADDRESS=C               LC_TELEPHONE=C
## [11] LC_MEASUREMENT=en_CA.UTF-8 LC_IDENTIFICATION=C
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets
## [6] methods   base
##
## other attached packages:
## [1] knitr_1.10
##
## loaded via a namespace (and not attached):
## [1] magrittr_1.5  formatR_1.2   tools_3.2.0   stringi_0.4-1
## [5] stringr_1.0.0 evaluate_0.7
```