

Homework 4 - <https://github.com/Henryblake2777/Homework4>

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2025-02-17

Contents

Problem 1 - Iron Bank	1
Null Hypothesis -	1
Test Statistic -	1
P-Value -	1
Probability Distribution -	2
Conclusion -	2
Problem 2 - Health Inspections -	2
Null Hypothesis -	2
Test Statistic -	2
P-Value -	2
Probability Distribution -	3
Conclusion -	3
Problem 3 - Jury Selection	3
Null Hypothesis -	3
Test Statistic -	3
Chi-Squared Value -	3
Probability Distribution -	4
Conclusion -	4
Problem 4 - LLM Watermarking	5
Part A: Null Distribution -	5
Part B: Checking For a Watermark -	5

Problem 1 - Iron Bank

Null Hypothesis -

$H_0 \rightarrow P = .024$

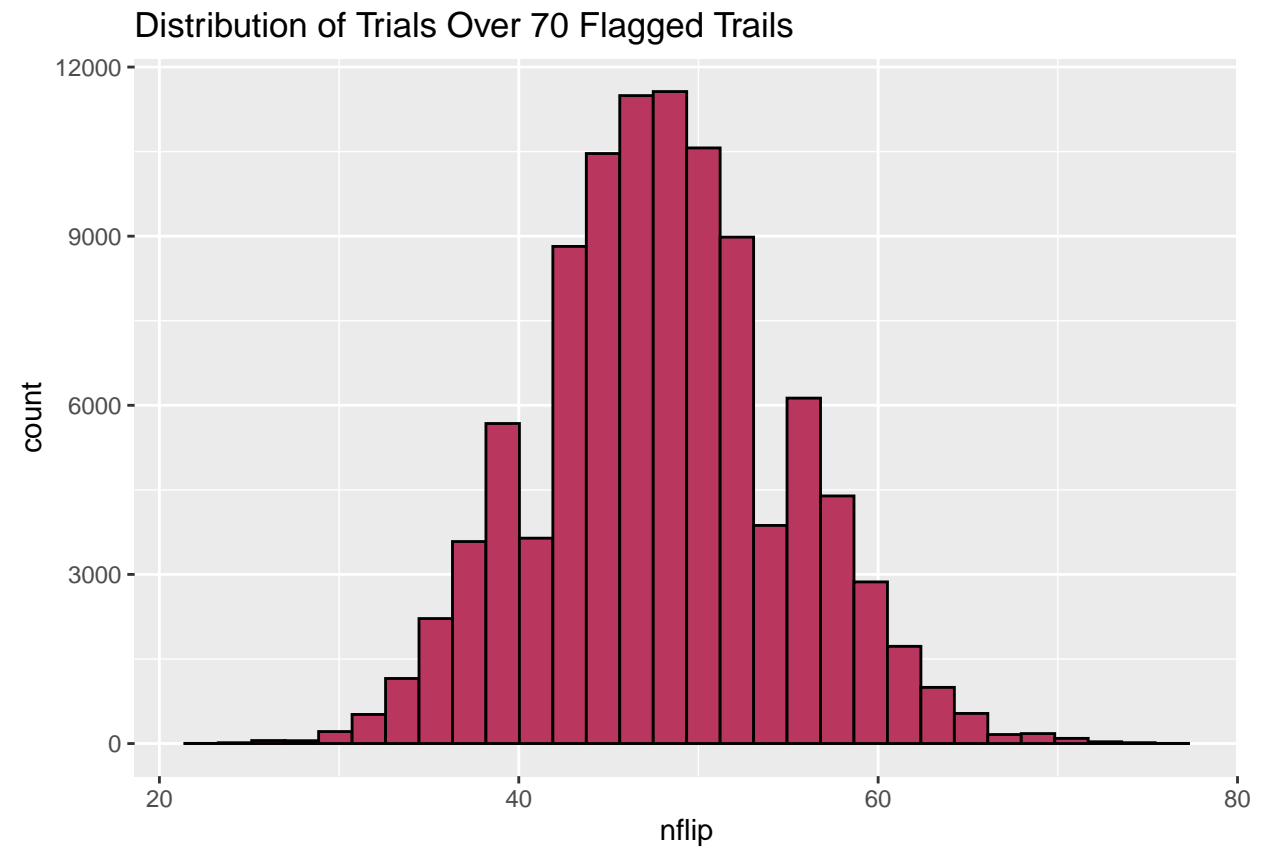
Test Statistic -

$TS = 0.0346 - 0.024 = 0.0106$

P-Value -

[1] 0.00141

Probability Distribution -



Conclusion -

Due to a p-value of .0013, there is significant evidence that the 70 flagged by the detection algorithm were unusually high and not due to simple variability.

Problem 2 - Health Inspections -

Null Hypothesis -

$H_0 \rightarrow P = .03$

Test Statistic -

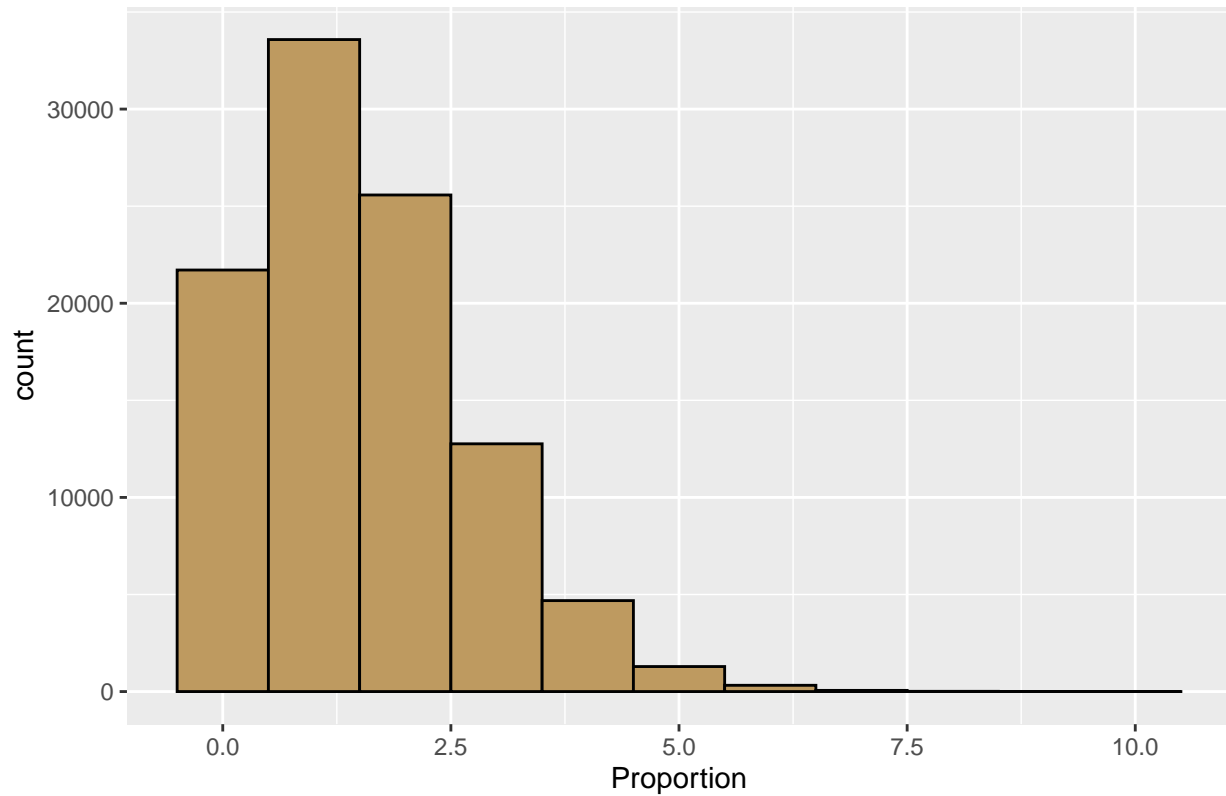
$TS = .16 - .03 = .13$

P-Value -

[1] 1

Probability Distribution -

Distribution of Trials Over 8 Failed Inspections



Conclusion -

Due to a p-value of practically 0, there is very significant evidence that the 8 failed health inspections by Gourmet Bites are not due to normal factors.

Problem 3 - Jury Selection

Null Hypothesis -

H0 -> Observed frequencies are consistent with the model

Test Statistic -

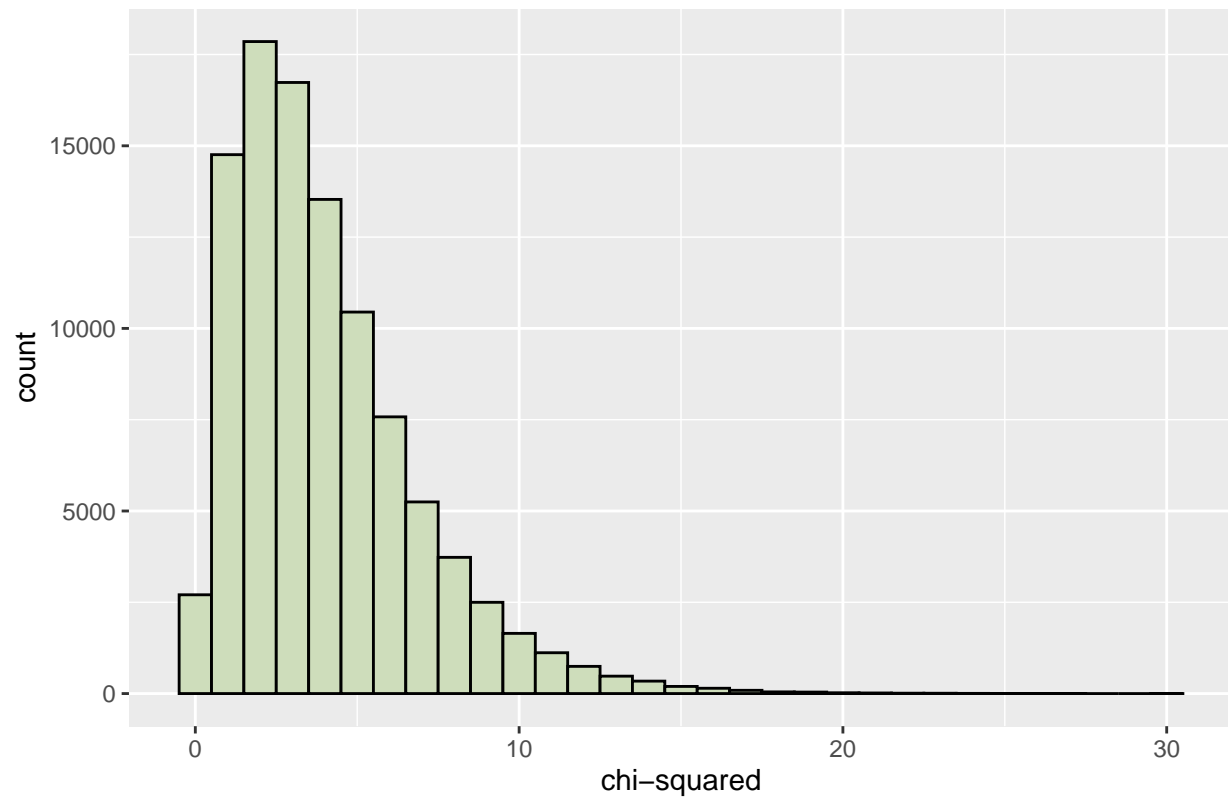
Ts = chi2 = 12.43

Chi-Squared Value -

[1] 0.01457

Probability Distribution -

Distribution of Chi-Squared values

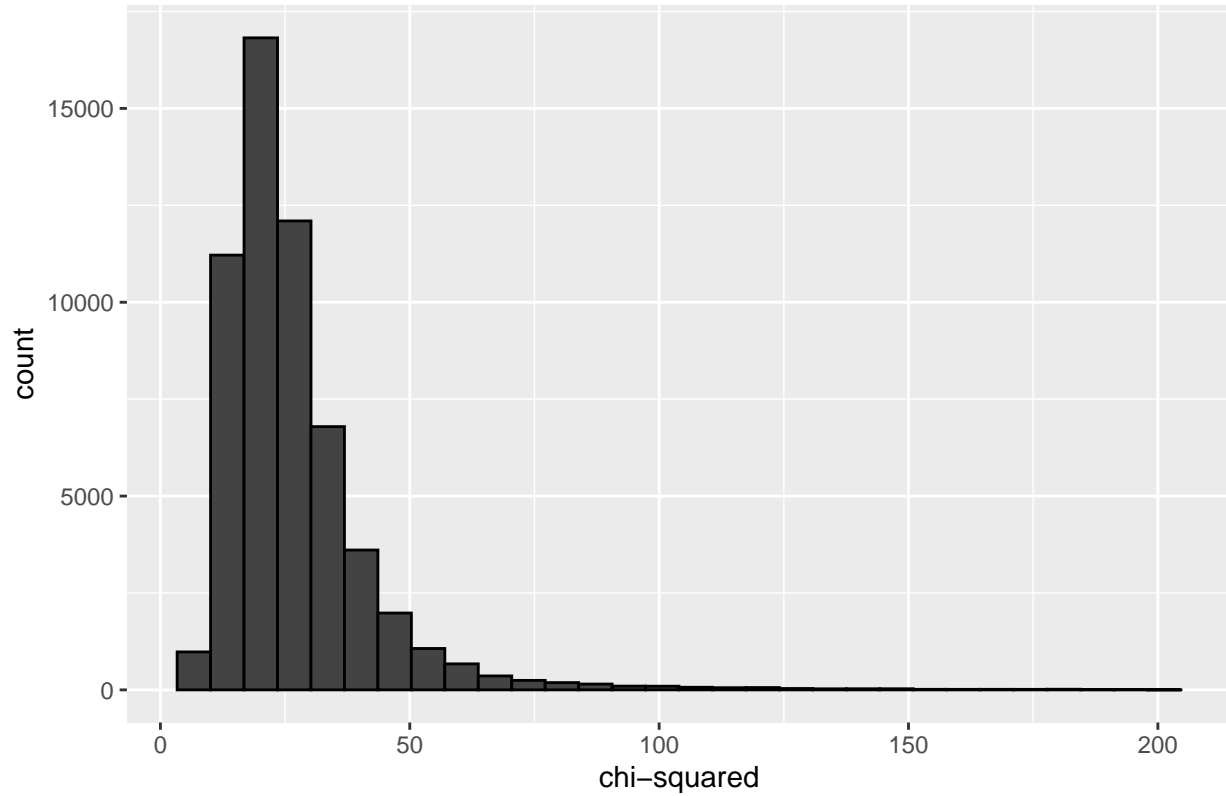


Conclusion -

Due to a p-value of .0143, there is intriguing evidence that the distribution of jurors selected by the judge does not follow the expected distribution. However, a confounding variable that may affect this could be the type of cases that the judge works.

Problem 4 - LLM Watermarking

Part A: Null Distribution - Distribution of Chi-Squared values



Part B: Checking For a Watermark -

```
## [1] 0.510 0.924 0.079 0.486 0.493 0.009 0.326 0.987 0.086 0.060
```

According to the p-values of the chi-squared statistics, sentence 6 seems to be the one that is watermarked because of the p-value of .009. It does not seem to follow the typical letter frequency distribution.