

THE CHI-SQUARE DISTRIBUTION: PRACTICE 3*

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Abstract

This module provides a practice on Chi-Square Distribution as a part of Elementary Statistics textbook.

1 Student Learning Outcomes

- The student will explore the properties of data with a test of a single variance.

2 Given

Suppose an airline claims that its flights are consistently on time with an average delay of at most 15 minutes. It claims that the average delay is so consistent that the variance is no more than 150 minutes. Doubting the consistency part of the claim, a disgruntled traveler calculates the delays for his next 25 flights. The average delay for those 25 flights is 22 minutes with a standard deviation of 15 minutes.

3 Sample Variance

Exercise 1

Is the traveler disputing the claim about the average or about the variance?

Exercise 2

(Solution on p. 3.)

A sample standard deviation of 15 minutes is the same as a sample variance of _____ minutes.

Exercise 3

Is this a right-tailed, left-tailed, or two-tailed test?

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4 Hypothesis Test

Perform a hypothesis test on the consistency part of the claim.

Exercise 4

H_o :

Exercise 5

H_a :

Exercise 6

Degrees of freedom =

(Solution on p. 3.)

Exercise 7

Chi² test statistic =

(Solution on p. 3.)

Exercise 8

p-value =

(Solution on p. 3.)

Exercise 9

Graph the situation. Label and scale the horizontal axis. Mark the mean and test statistic. Shade the p-value.



Exercise 10

Let $\alpha = 0.05$

Decision:

Conclusion (write out in a complete sentence):

5 Discussion Questions

Exercise 11

How did you know to test the variance instead of the mean?

Exercise 12

If an additional test were done on the claim of the average delay, which distribution would you use?

Exercise 13

If an additional test was done on the claim of the average delay, but 45 flights were surveyed, which distribution would you use?



Solutions to Exercises in this Module

Solution to Exercise 2 (p. 1)

225

Solution to Exercise 6 (p. 2)

24

Solution to Exercise 7 (p. 2)

36

Solution to Exercise 8 (p. 2)

0.0549

