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Chi-Square Goodness-of-fit, Part Two

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1. Jurors are selected from the list of registered voters, so the ages for jurors should have the same distribution as the ages of voters. A law professor obtains voter registration records and finds that 20% of registered voters are 18-29, 45% are 30-49, and 35% are age 50 or older. The

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professor then monitors jury composition over a month-long period and finds the following distribution of jurors:

18-29 years old	30-49 years old	50 years old and over
12	36	32

(1/1 point)
1a. We want to match the distribution of a categorical variable to a hypothesized distribution model. Which Chi Square test should we run?

- (●) Goodness-of-fit ✔
- ( ) Test of Independence

(1/1 point)
1b. The null hypothesis is H_0: The ages of jurors are distributed the same way as the ages of voters. What is the alternative hypothesis?

- ( ) There are more older jurors than younger jurors.
- ( ) There is no relationship between the age of jurors and the age of voters.
- (●) The age of jurors are not distributed the same way as the ages of voters. ✔

1c. One law student divides the total number of jurors by the number of categories and comes up with the following expected values for each category:

18-29 years old	30-49 years old	50 years old and over

26.67	26.67	26.67

What did he do wrong?

(1/1 point)

- He found expected values using the method for a test of independence instead of a goodness of fit test.
- He came up with expected values that are not whole numbers; it's not possible to have 26.67 people.
- He did his division wrong.
- (selected) He assumed the jurors should be evenly distributed across the categories, but this is not the hypothesized model. ✔

(3/3 points)

1d. Find the expected values for each category, assuming the age distributions of jurors and voters are the same.

18-29 years old: *(Report as a whole number.)*

16 ✔

Answer: 16

16

30-49 years old: *(Report as a whole number.)*

36 ✔

Answer: 36

36

50 years or older: *(Report as a whole number.)*

28 ✔

Answer: 28

28

(1/1 point)

1e. Find the chi-square statistic using the following formula:

$$\chi^2 = \sum \frac{(obs-exp)^2}{exp}$$

- 1.289
- 1.571 ✔
- 3.028
- 0.023

(1/1 point)

1f. What is the degrees of freedom for this hypothesis test?

2 ✔

Answer: 2

2

(1/1 point)

1g. What is the critical Chi-square value for this hypothesis test? (Rounded to 2 decimal places)

- 2.33
- 5.99 ✔
- 6.43
- -4.35

(1/1 point)
1h. Based on your above answers, you should _____ the null hypothesis.

fail to reject ▾ ✔ **Answer:** fail to reject

(1/1 point)
1i. What is the appropriate interpretation of this hypothesis test?

- ◉ We have no evidence to suggest that the age distributions of jurors are any different than those of registered voters. ✔
- ○ Jurors are older than registered voters; these distributions are not the same.
- ○ There is no relationship between the age of jurors and the age of voters.
- ○ Age of jurors and age of voters are related.