

JMP INTRO® Lab Activities

Lab Activity – One-Proportion z-test Compared to Chi Square

Data Set: Big Class

This data is a random sample of students attending a school function. You will determine if the proportion of females at the event is different from 0.5.

- Using JMP INTRO open Data file **Big Class**. You will be interested in the column that is sex.

- Using your TI-83 perform a large sample z-test to determine if the proportion of females is greater than 0.5, showing all parts of the problem.

- Open the data tables by clicking the blue triangle (*Notice that “sex” is nominal data*)
- Select **Analyze** ® **Distribution** select **Sex, Y, Column** and click **OK**

Using the data from the frequencies do you think there is evidence to think that there is a difference between the males and females that favor the prom in April?
Explain

How do the results from the computer compare to the results from your calculator?

- Click the **red triangle in sex® Test Probabilities**
(You should now also see a Test Probabilities table)
- Enter **.5** for level **F** and **.5** for level **M**, click **Done**
(You should now see additional information with Chi-Square and Prob>Chi square)

1. What does the values 0.45000 and 0.55000 represent in the frequency table?

3. What was the z score for the one proportion z-test.

4. Looking at the computer output how is the Pearson Chi Square value related to the z- score in problem 3.

5. How is the p-value in the one proportion z-test related to the Pearson chi square probability?

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Teacher Notes

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Objectives:

- The students will be able to do a one-proportion test on JMP INTRO.
- The students compare the results from the TI-83 to the results in JMP INTRO.

Time Required: 30 Minutes

JMP INTRO Notes:

- The program does not have an option for a one-proportion z-test. However, the Chi-Square goodness of fit test can be used to produce an equivalent result since the data are categorical.

Concept Notes:

- It is important that the student understand that a proportion test must involve categorical data.
- The test of $H_0: p = .5$ vs $H_A: p \neq .5$ using a one sample z test is equivalent to a chi-square goodness of fit test for one-way table with two categories. In the Chi-Square test the null hypothesis should be that each of the two-category proportion was .5. Also note that the chi-square test is equivalent to the two-tailed test.
- A proportion test parallels a Chi-Square test. If the student squares the z score they will see the chi-square value.
- It is important that the students check the assumptions for this test.

JMP INTRO® Lab Activities Answer Key

Suggested Answers to One Proportion z-test Compared to Chi Square

Using the TI-83 Assumptions $np > 10$ $n(1-p) > 10$ $40(.5) > 10$

H_0 $p = .5$ \hat{p} The proportion of females from a random sample of 40 that attending the school function
This value is $18/40$ which is 45%

H_a $p \neq .5$

$$Z = \frac{.45 - .50}{\sqrt{\frac{.5(.5)}{40}}} = -.6325$$

$$z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}}$$

$$P(|z| > .6325) = .5267$$

Conclusion: With a p-value of .5267 and at the alpha level of .05, there is insufficient evidence to reject the Null. There is not enough evidence to conclude that the proportion of females that attended the event is different than the proportion of males.

The computer results do not show the z- score but list the probability as a Chi-Square distribution.