

Reject or Fail to Reject?

ID: 13714

Time required
15 minutes

Activity Overview

In this activity, students find P -values, to test claims about proportions, using the **1-Prop z Test** command in the Calculator application.

Topic: Hypothesis Testing

- Use the sampling distribution of a proportion \hat{p} to test the null hypothesis $H_0: p = p_0$ against the alternative one-tailed hypothesis $H_a: p < p_0$ or the two-tailed hypothesis $H_a: p \neq p_0$.

Teacher Preparation and Notes

- This activity is intended to be mainly **student-centered**, with breaks for discussion.
- This activity assumes knowledge of binomial experiments and the requirements for a binomial experiment.
- Students should already be familiar with the basic concepts behind hypothesis testing, including finding z -scores and critical values to test claims.
- **To download the student and solution TI-Nspire documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter “13714” in the quick search box.**

Associated Materials

- *RejectNotReject_Student.doc*
- *RejectNotReject.tns*
- *RejectNotReject_Soln.tns*

Suggested Related Activities

To download any TI-Nspire technology activity listed, go to education.ti.com/exchange and enter the number in the quick search box.

- *Estimating a Population Proportion (TI-Nspire technology)* — 9986
- *Claims About Two Proportions (TI-Nspire technology)* — 10259
- *Difference Between Two Proportions (TI-Nspire technology)* — 10082
- *Candy Pieces (TI-Nspire technology)* — 9997

Problem 1 – Lefties

Discuss how hypothesis testing can be used to test claims about proportions, and that the test statistic is z , given that the requirements for a binomial experiment are met.

On page 1.2, students are told to test the claim that 10% of Americans are left-handed.

Explain to students that testing at $\alpha = 0.05$ means testing at a 95% confidence level.

On page 1.3, students are to select the null and alternative hypotheses. This is a two-tailed test.

On page 1.4, students are to use the **1-Prop z Test** command (**MENU > Statistics > Stat Tests**) to find the P -values for each test. The P -values are about 0.55 and 0.17, both above 0.10, the significance level.

Discuss with students if they should reject or fail to reject the 10% claim for the students at this school.

The P -value is about 23.9%, much greater than 5%, so they should fail to reject the null hypothesis.

1.1 1.2 1.3 *RejectNotReject

One claim states that 10% of Americans are left-handed. A student wants to test if this claim is true for the students at his school. He surveyed 82 randomly selected students and found that 5 of them are left-handed. Is this enough evidence to say that the 10% figure does not hold for his school? Test the claim at $\alpha = 0.05$.

1.1 1.2 1.3 *RejectNotReject

What is the null and alternative hypothesis?

$H_0: p \neq 0.10, H_a: p = 0.10$

$H_0: p = 0.10, H_a: p \neq 0.10$

$H_0: p = 0.10, H_a: p < 0.10$

$H_0: p = 0.10, H_a: p > 0.10$

1.2 1.3 1.4 *RejectNotReject

Find the P -value below using the **1-Prop z Test** command in the Statistics menu.

"Title"	"1-Prop z Test"
"Alternate Hyp"	"prop \neq p0"
"z"	-1.17794
"PVal"	0.238822
" \hat{p} "	0.060976
"n"	82.

1/1

1.3 1.4 1.5 *RejectNotReject

Do you reject or fail to reject H_0 ? Why?

Fail to reject, the p -value is greater than 0.05.

Problem 2 – Loaded Cube?

Students are introduced to the loaded number cube scenario on page 2.1. Confirm that the requirements for a binomial experiment are met.

Students are to determine their null and alternative hypotheses on the next page. This is a right-tailed test.

$$H_0: p = 0.1\bar{6}, H_a: p > 0.1\bar{6}$$

Students are to find the *P*-value on the next page. The value is about 0.000405.

Discuss with students if they should reject or fail to reject the claim that sixes come up more than they should.

Because the *P*-value is less than the significance level of 0.01, the students should reject the null hypothesis. Sixes are coming up more than expected.

