Section 10: Comparing Two Groups

The following maps the videos in this section to the Texas Essential Knowledge and Skills for Mathematics TAC §111.47(c).

10.01 Choosing the Right Case

- Statistics (1)(B)
- Statistics (4)(A)

10.02 Confidence Interval for Two Independent Means

- Statistics (1)(G)

10.03 Hypothesis Test for Two Independent Means

- Statistics (1)(G)
- Statistics (6)(F)
- Statistics (6)(G)
- Statistics (6)(H)
- Statistics (6)(I)

10.04 Confidence Interval for Two Independent Proportions

- Statistics (1)(G)

10.05 Hypothesis Test for Two Independent Proportions

- Statistics (1)(G)
- Statistics (6)(F)
- Statistics (6)(G)
- Statistics (6)(H)
- Statistics (6)(I)

Note: Unless stated otherwise, any sample data is fictitious and used solely for the purpose of instruction.

10.01

Choosing the Right Case

Statistics vs. Parameters

Scenario	Sample Statistic	Population Parameter
One mean	$\bar{x}$	μ
Two independent means	$\bar{x}_1 - \bar{x}_2$	$\mu_1 - \mu_2$
Matched pairs	$\bar{x}_d$	μ_d
One proportion	$\hat{p}$	p
Two independent proportions	$\hat{p}_1 - \hat{p}_2$	$p_1 - p_2$

Choosing the Right Case

Ask yourself three questions:

- Question 1: Am I dealing with means (_____ data) or proportions (_____ data)?

- Question 2: Am I dealing with a one sample or two sample study?

- Question 3: If there are two samples, are they independent or dependent?

Match each of the following situations with the parameter of interest from the list below.

- One mean, μ
- Two independent means, $\mu_1 - \mu_2$
- Matched pairs, μ_d
- One proportion, p
- Two independent proportions, $p_1 - p_2$

1. A survey finds that 41 percent of teens use Snapchat.

2. While many are unsure of their number of Instagram followers, the average number of followers for American teenagers is 150.

3. Do teenagers text less than their parents? A sample of 45 teenagers and their mothers was recorded to compare the difference in texts sent.

4. Among American teenagers, 61 percent of females and 44 percent of males use Instagram.

5. A survey found that among teenagers, males have fewer friends on Facebook than females.

6. One third of teens are unsure of how many Facebook friends they have.

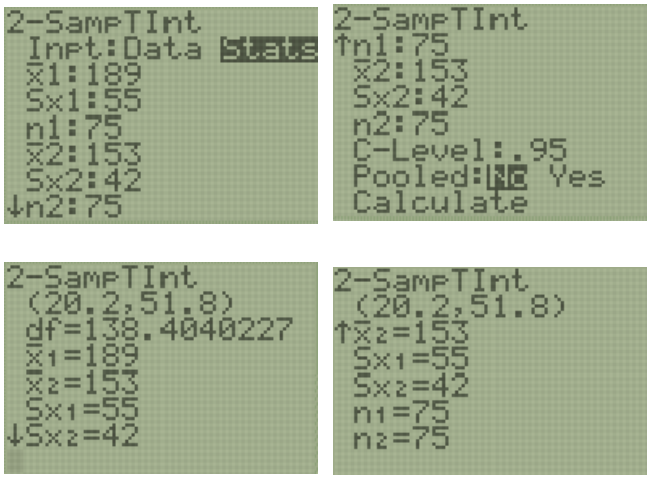
7. In a recent survey, 162 of the 523 males reported that they use Snapchat and 274 of the 527 females reported that they use Snapchat.

8. Young teens send an average of 56 texts per day, while older teens send an average of 74.

10.02

Confidence Interval for Two Independent Means

It is thought that there is a difference between teenage girls and boys in the average number of Instagram followers. Group 1 is teenage girls and group 2 is teenage boys.



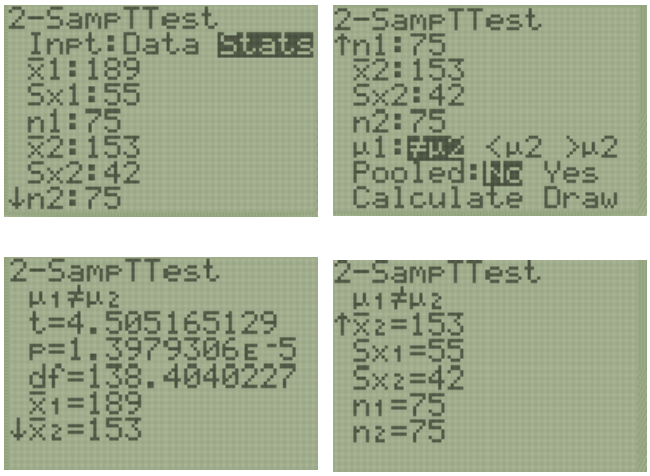
1. Do the required assumptions and conditions appear to be met?

2. Use the output above to draw a conclusion about the difference in Instagram followers for teenage boys and teenage girls.

10.03

Hypothesis Test for Two Independent Means

Is there a significant difference in Instagram followers based on gender? Suppose a random sample of teens yielded these results.

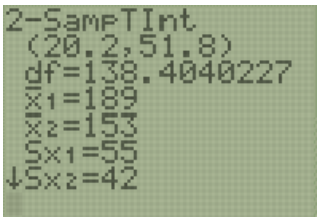


1. Do the required assumptions and conditions appear to be met?

2. State the appropriate null and alternative hypotheses.

3. Use the output above to make a conclusion using α = 0.05.

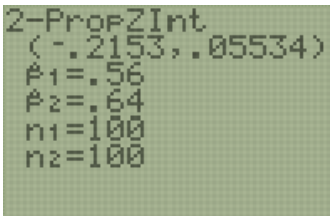
4. Based on the confidence interval below, can we conclude that there is a significant difference in the average number of Instagram followers between teenage girls and boys?



10.04

Confidence Interval for Two Independent Proportions

Girls are significantly more likely to use Instagram, but if we investigate further can we see differences among girls? Suppose that out of a random sample of 100 teenage girls age 13–14 (group 1), 56 reported that they use Instagram. Sixty-four of the 100 randomly selected teenage girls age 15–17 (group 2) reported that they use Instagram. Use the output below to provide the information requested .



1. Identify the parameter of interest and its estimate.

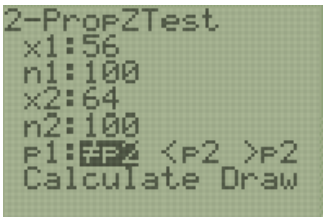
2. Are the required assumptions and conditions met to construct a 95% confidence interval?

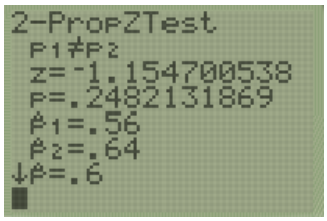
3. Interpret the results of the confidence interval.

10.05

Hypothesis Test for Two Independent Proportions

Girls are significantly more likely to use Instagram, but if we investigate further can we see differences among girls? Suppose that out of a random sample of 100 teen girls age 13–14 (group 1), 56 reported that they use Instagram. Sixty-four of the 100 randomly selected teenage girls age 15–17 (group 2) reported that they use Instagram. Use the output below to provide the information requested.





1. Identify the parameter of interest and its estimate.

2. Are the required assumptions and conditions met to perform a two-proportion z-test?

3. State the null and alternative hypotheses.

4. Identify the test statistic and p-value.

5. Make a conclusion using a significance level of α =0.05.

6. Using the confidence interval below, what conclusion can be drawn?