Hypothesis Testing: Two Population Means and Two Population Proportions: Practice 1*

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Abstract

This module provides a practice of Two Population Means and Two Population Proportions as a part of Collaborative Statistics collection (col10522) by Barbara Illowsky and Susan Dean.

1 Student Learning Outcomes

• The student will conduct a hypothesis test of two proportions.

2 Given

In the recent Census, 3 percent of the U.S. population reported being two or more races. However, the percent varies tremendously from state to state. (Source: http://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf) Suppose that two random surveys are conducted. In the first random survey, out of 1000 North Dakotans, only 9 people reported being of two or more races. In the second random survey, out of 500 Nevadans, 17 people reported being of two or more races. Conduct a hypothesis test to determine if the population percents are the same for the two states or if the percent for Nevada is statistically higher than for North Dakota.

3 Hypothesis Testing: Two Proportions

Exercise 1	(Solution on p. 3.)
Is this a test of means or proportions?	
Exercise 2 State the null and alternative hypotheses.	(Solution on p. 3.)
- 11	

a. H₀: **b.** H_a:

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Exercise 3 Is this a right-tailed, left-tailed, or two-tailed test? How do you know?	(Solution	on p.	3.)
Exercise 4 What is the Random Variable of interest for this test?			
Exercise 5 In words, define the Random Variable for this test.			
Exercise 6 Which distribution (Normal or student's-t) would you use for this hypothesis	(Solution s test?	on p.	3.)
Exercise 7 Explain why you chose the distribution you did for the above question.			
Exercise 8 Calculate the test statistic.	(Solution	on p.	3.)

Exercise 9

Sketch a graph of the situation. Mark the hypothesized difference and the sample difference. Shade the area corresponding to the p-value.





Exercise 10 Find the *p*-value: Exercise 11

At a pre-conceived $\alpha = 0.05$, what is your:

a. Decision:

b. Reason for the decision:

c. Conclusion (write out in a complete sentence):

4 Discussion Question

Exercise 12

Does it appear that the proportion of Nevadans who are two or more races is higher than the proportion of North Dakotans? Why or why not?

(Solution on p. 3.)

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Solutions to Exercises in this Module

Solution to Exercise (p. 1) Proportions Solution to Exercise (p. 1)

a. $H_0:_{PN}=_{PND}$

a. $H_a:_{PN} > _{PND}$

Solution to Exercise (p. 2) right-tailed Solution to Exercise (p. 2) Normal Solution to Exercise (p. 2) 3.50 Solution to Exercise (p. 2) 0.0002 Solution to Exercise (p. 2)

a. Reject the null hypothesis