

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Assume that the assumptions and conditions for inference with a two-sample t-test are met. Test the indicated claim about the means of the two populations.

- 1) A paint manufacturer wishes to compare the drying times of two different types of paint. Independent random samples of 11 cans of type A and 9 cans of type B were selected and applied to similar surfaces. The drying times (in minutes) were recorded. The summary statistics are as follows. 1) _____

Type A	Type B
$\bar{x}_1 = 74.1$	$\bar{x}_2 = 64.9$
$s_1 = 4.5$	$s_2 = 5.1$
$n_1 = 11$	$n_2 = 9$

Do the data provide sufficient evidence to conclude that the mean drying time for type A differs from the mean drying time for type B? Perform a t-test at the 1% significance level.

- 2) A researcher was interested in comparing the amount of time spent watching television by women and by men. Independent random samples of 14 women and 17 men were selected and each person was asked how many hours he or she had watched television during the previous week. The summary statistics are as follows. 2) _____

Sample 1 (women)	Sample 2 (men)
$\bar{x}_1 = 12.9$	$\bar{x}_2 = 13.6$
$s_1 = 3.9$	$s_2 = 5.2$
$n_1 = 14$	$n_2 = 17$

Do the data provide sufficient evidence to conclude that the mean time for women is less than the mean time for men? Perform a t-test at the 5% significance level.

Use a two proportion z-test to perform the required hypothesis test. State the conclusion.

- 3) A researcher finds that of 1,000 people who said that they attend a religious service at least once a week, 31 stopped to help a person with car trouble. Of 1,200 people interviewed who had not attended a religious service at least once a month, 22 stopped to help a person with car trouble. At the 0.05 significance level, do the data provide sufficient evidence to conclude that the two proportions are different? 3) _____
- 4) 7 of 8,500 people vaccinated against a certain disease later developed the disease. 18 of 10,000 people vaccinated with a placebo later developed the disease. Test the claim that the vaccine is effective in lowering the incidence of the disease. Use a significance level of 0.02. 4) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

A two-sample z-test for two population proportions is to be performed using the P-value approach. The null hypothesis is $H_0 : p_1 = p_2$ and the alternative is $H_a : p_1 \neq p_2$. Use the given sample data to find the P-value for the hypothesis test. Give an interpretation of the p-value.

- 5) A poll reported that 41 of 100 men surveyed were in favor of increased security at airports, while 35 of 140 women were in favor of increased security. 5) _____
- A) P-value = 0.0086; If there is no difference in the proportions, there is about a 0.86% chance of seeing the observed difference or larger by natural sampling variation.
 - B) P-value = 0.0512; If there is no difference in the proportions, there is about a 5.12% chance of seeing the observed difference or larger by natural sampling variation.
 - C) P-value = 0.4211; If there is no difference in the proportions, there is a 42.11% chance of seeing the exact observed difference by natural sampling variation.
 - D) P-value = 0.0086; There is about a 0.86% chance that the two proportions are equal.
 - E) P-value = 0.0512; There is about a 5.12% chance that the two proportions are equal.
- 6) The health department tests the water for chlorine Monday with readings of 4 mg out of 100 mL. On Thursday when the water is retested, the health dept. gets readings of 5 mg out of 120 mL. 6) _____
- A) P-value = 0.9504; There is about a 95.04% chance that the two proportions are equal.
 - B) P-value = 0.4761; If there is no difference in the proportions, there is about a 47.61% chance of seeing the observed difference or larger by natural sampling variation.
 - C) P-value = 0.9504; If there is no difference in the proportions, there is about a 95.04% chance of seeing the observed difference or larger by natural sampling variation.
 - D) P-value = 0.4761; There is about a 47.61% chance that the two proportions are equal.
 - E) P-value = 0.5239; If there is no difference in the proportions, there is about a 52.39% chance of seeing the observed difference or larger by natural sampling variation.

Answer Key

Testname: MORE HYPOTHESIS TESTING

1) $H_0 : \mu_1 - \mu_2 = 0$

$H_A : \mu_1 - \mu_2 \neq 0$

Test statistic: $t = 4.230$

P-value < 0.01

DF = 16.18

Reject H_0 . At the 1% significance level, the data provide sufficient evidence to conclude that the mean drying time for type A differs from the mean drying time for type B.

2) $H_0 : \mu_1 - \mu_2 = 0$

$H_A : \mu_1 - \mu_2 < 0$

Test statistic: $t = -0.428$

P-value > 0.05

DF = 28.79

Do not reject H_0 . At the 5% significance level, the data do not provide sufficient evidence to conclude that the mean time for women is less than the mean time for men.

3) $H_0: p_1 - p_2 = 0$ $H_A: p_1 - p_2 \neq 0$

Test statistic: $z = 1.93$

P-value = 0.0536

Fail to reject the null hypothesis. There is not sufficient evidence to conclude that the two proportions are different.

4) $H_0: p_1 - p_2 = 0$ $H_a: p_1 - p_2 < 0$

Test statistic: $z = -1.80$

P-value = 0.0359

Fail to reject the null hypothesis. There is not sufficient evidence to support the claim that the vaccine is effective in lowering the incidence of the disease, at this significance level.

5) A

6) C