

Read these directions carefully. As usual, you may pick any part of one problem to omit by writing OMIT in the answer blank (any one multiple choice or any one part of the other problems). If you do not, or mark more than one omit, then all parts will be graded. Relax and use your time wisely.

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

Assume that a hypothesis test of the given claim will be conducted. Identify the type I or type II error for the test.

- 1) The principal of a school claims that the percentage of students at his school that come from single-parent homes is 11%. Identify the type II error for the test. 1) _____
- A) Reject the claim that the percentage of students that come from single-parent homes is equal to 11% when that percentage is actually less than 11%.
- B) Fail to reject the claim that the percentage of students that come from single-parent homes is equal to 11% when that percentage is actually different from 11%.
- C) Reject the claim that the percentage of students that come from single-parent homes is equal to 11% when that percentage is actually 11%.
- D) Fail to reject the claim that the percentage of students that come from single-parent homes is equal to 11% when that percentage is actually 11%.

Express the null hypothesis and the alternative hypothesis in symbolic form. Use the correct symbol (μ , p , σ) for the indicated parameter.

- 2) Carter Motor Company claims that its new sedan, the Libra, will average better than 23 miles per gallon in the city. Use μ , the true average mileage of the Libra. 2) _____
- A) $H_0: \mu = 23$ B) $H_0: \mu = 23$ C) $H_0: \mu > 23$ D) $H_0: \mu < 23$
- $H_1: \mu > 23$ $H_1: \mu < 23$ $H_1: \mu \leq 23$ $H_1: \mu \geq 23$

Assume that the data has a normal distribution and the number of observations is greater than fifty. Find the critical z value used to test a null hypothesis.

- 3) $\alpha = 0.1$ for a two-tailed test. 3) _____
- A) ± 1.4805 B) ± 1.645 C) ± 2.33 D) ± 2.052

Determine the decision criterion for rejecting the null hypothesis in the given hypothesis test; i.e., describe the values of the test statistic that would result in rejection of the null hypothesis.

- 4) Suppose you wish to test the claim that μ_d , the mean value of the differences d for a population of paired data, is greater than 0. Given a sample of $n = 15$ and a significance level of $\alpha = 0.01$, what criterion would be used for rejecting the null hypothesis? 4) _____
- A) Reject null hypothesis if test statistic < 2.624 .
- B) Reject null hypothesis if test statistic > 2.624 .
- C) Reject null hypothesis if test statistic > 2.602 .
- D) Reject null hypothesis if test statistic > 2.977 or < -2.977 .

Find the number of successes x suggested by the given statement.

- 5) Among 630 adults selected randomly from among the residents of one town, 22.9% said that they favor stronger gun-control laws. 5) _____
- A) 145 B) 144 C) 142 D) 143

Find the value of the test statistic.

- 6) The claim is that the proportion of accidental deaths of the elderly attributable to residential falls is more than 0.10, and the sample statistics include $n = 800$ deaths of the elderly with 15% of them attributable to residential falls. 6) _____
- A) -3.96 B) -4.71 C) 3.96 D) 4.71

Solve the problem.

- 7) The table shows the number of households burglarized in a sample of households with dogs and in a sample of households without dogs. Assume that you plan to use a significance level of $\alpha = 0.01$ to test the claim that $p_1 < p_2$. Find the critical value(s) for this hypothesis test. Do the data support the claim that a smaller proportion of households with pet dogs are burglarized? 7) _____

	Household with Dog	Household without Dog
Number of households in sample	208	126
Number of households burglarized	21	15

- A) $z = 2.33$; yes B) $z = -2.575$; no C) $z = -2.33$; no D) $z = -1.96$; yes

Assume that you plan to use a significance level of $\alpha = 0.05$ to test the claim that $p_1 = p_2$. Use the given sample sizes and numbers of successes to find the z test statistic for the hypothesis test.

- 8) In a vote on the Clean Water bill, 46% of the 205 Democrats voted for the bill while 48% of the 230 Republicans voted for it. 8) _____
 A) $z = -0.417$ B) $z = -0.250$ C) $z = -0.354$ D) $z = -0.459$

Find the P-value for the indicated hypothesis test.

- 9) An airline claims that the no-show rate for passengers booked on its flights is less than 6%. Of 380 randomly selected reservations, 18 were no-shows. Find the P-value for a test of the airline's claim. 9) _____
 A) 0.0746 B) 0.3508 C) 0.1492 D) 0.1230

Assume that you plan to use a significance level of $\alpha = 0.05$ to test the claim that $p_1 = p_2$. Use the given sample sizes and numbers of successes to find the P-value for the hypothesis test.

- 10) $n_1 = 200$ $n_2 = 100$ 10) _____
 $x_1 = 11$ $x_2 = 8$
 A) 0.4010 B) 0.0012 C) 0.0201 D) 0.1011

Construct the indicated confidence interval for the difference between the two population means. Assume that the two samples are independent simple random samples selected from normally distributed populations. Do not assume that the population standard deviations are equal.

- 11) Independent samples from two different populations yield the following data. $\bar{x}_1 = 958$, $\bar{x}_2 = 157$, $s_1 = 77$, $s_2 = 88$. The sample size is 478 for both samples. Find the 85% confidence interval for $\mu_1 - \mu_2$. 11) _____
 A) $791 < \mu_1 - \mu_2 < 811$ B) $781 < \mu_1 - \mu_2 < 821$
 C) $793 < \mu_1 - \mu_2 < 809$ D) $800 < \mu_1 - \mu_2 < 802$

Construct a confidence interval for μ_d , the mean of the differences d for the population of paired data. Assume that the population of paired differences is normally distributed.

- 12) The table below shows the weights of 9 subjects before and after following a particular diet for two months. 12) _____

Subject	A	B	C	D	E	F	G	H	I
Before	168	180	157	132	202	124	190	210	171
After	162	178	145	125	171	126	180	195	163

- Construct a 99% confidence interval for the mean difference of the "before" minus "after" weights.
 A) $-0.6 < \mu_d < 20.4$ B) $2.8 < \mu_d < 17.0$ C) $4.51 < \mu_d < 15.7$ D) $2.4 < \mu_d < 17.4$

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

13) A simple random sample of 15-year old boys from one city is obtained and their weights (in pounds) are listed below. Use a 0.01 significance level to test the claim that these sample weights come from a population with a mean equal to 149 lb. Assume that the standard deviation of the weights of all 15-year old boys in the city is known to be 16.6 lb. Use the traditional method of testing hypotheses. 13) _____

150 141 160 151 134 189 157 144 175 127 164

a) Write the null and alternative hypothesis in symbolic form (use the correct symbols).

b) Find the critical value(s)

c) Draw the curve and label the rejection region(s) "reject H_0 ". Place the critical values on the graph.

d) Find the test statistic

e) Determine the p-value.

f) State your decision (exactly as we did repeatedly in class)

g) State your conclusion (exactly as we did repeatedly in class)

14) In a sample of 47 adults selected randomly from one town, it is found that 9 of them have been exposed to a particular strain of the flu. Use an 0.05 significance level to test the claim that the proportion of all adults in the town that have been exposed to this strain of the flu is 8%.

14) _____

a) Write the null and alternative hypothesis in symbolic form (use the correct symbols).

b) Find the critical value(s)

c) Draw the curve and label the rejection region(s) "reject H_0 ". Place the critical values on the graph.

d) Find the test statistic

e) Determine the p-value.

f) State your decision (exactly as we did repeatedly in class)

g) State your conclusion (exactly as we did repeatedly in class)

Answer Key

Testname: 2014 FALL TEST 4

- 1) B
- 2) A
- 3) B
- 4) B
- 5) B
- 6) D
- 7) C
- 8) A
- 9) C
- 10) A
- 11) C
- 12) A

13) $H_0: \mu = 149$ lb

$H_1: \mu \neq 149$ lb

Test statistic: $z = 0.96$

Critical-values: $z = \pm 2.575$

Do not reject H_0 ; At the 1% significance level, there is not sufficient evidence to warrant rejection of the claim that these sample weights come from a population with a mean equal to 149 lb.

14) 0.0048