

Express the null hypothesis and the alternative hypothesis in symbolic form for a test to support this claim.

- 1) A skeptical paranormal researcher claims that the proportion of Americans that have seen a UFO, p , is less than 2 in every one thousand. 1) _____
 A) $H_0: p = 0.002$ B) $H_0: p < 0.002$ C) $H_0: p = 0.002$ D) $H_0: p > 0.002$
 $H_1: p < 0.002$ $H_1: p \geq 0.002$ $H_1: p > 0.002$ $H_1: p \leq 0.002$
- 2) The manufacturer of a refrigerator system for beer kegs produces refrigerators that are supposed to maintain a true mean temperature, μ , of 48°F, ideal for a certain type of German pilsner. The owner of the brewery does not agree with the refrigerator manufacturer, and claims he can prove that the true mean temperature is incorrect. 2) _____
 A) $H_0: \mu \neq 48^\circ$ B) $H_0: \mu \geq 48^\circ$ C) $H_0: \mu = 48^\circ$ D) $H_0: \mu \leq 48^\circ$
 $H_1: \mu = 48^\circ$ $H_1: \mu < 48^\circ$ $H_1: \mu \neq 48^\circ$ $H_1: \mu > 48^\circ$
- 3) A psychologist claims that more than 5.8 percent of the population suffers from professional problems due to extreme shyness. Use p , the true percentage of the population that suffers from extreme shyness. 3) _____
 A) $H_0: p = 5.8\%$ B) $H_0: p = 5.8\%$ C) $H_0: p = 5.8\%$ D) $H_0: p = 5.8\%$
 $H_1: p \leq 5.8\%$ $H_1: p < 5.8\%$ $H_1: p \geq 5.8\%$ $H_1: p > 5.8\%$
- 4) A formal hypothesis test is to be conducted using the claim that the mean body temperature is equal to 98.6°F. What is the null hypothesis and how is it denoted? 4) _____
 A) $H_0: \mu = 98.6^\circ\text{F}$ B) $H_0: p = 98.6^\circ\text{F}$ C) $H_0: \mu \neq 98.6^\circ\text{F}$ D) $H_0: p < 98.6^\circ\text{F}$

Find the value of the test statistic z :

- 5) A claim is made that the proportion of children who play sports is less than 0.5, and the sample statistics include 1320 subjects with 396 saying that they play a sport. 5) _____
 A) -29.66 B) 29.66 C) 14.53 D) -14.53
 $H_0: p = 0.5$ $H_1: p < 0.5$ $x = 396$ $n = 1320$ Run 1PropZTest
- 6) The claim is that the proportion of drowning deaths of children attributable to beaches is more than 0.25, and the sample statistics include 696 drowning deaths of children with 208 of them attributable to beaches. 6) _____
 A) 2.98 B) 2.88 C) -2.88 D) -3.05
 $H_0: p = 0.25$ $H_1: p > 0.25$ $x = 208$ $n = 696$ Run 1PropZTest

Formulate the indicated conclusion in nontechnical terms. Be sure to address the original claim.

- 7) Carter Motor Company claims that its new sedan, the Libra, will average better than 32 miles per gallon in the city. Assuming that a hypothesis test to support this claim has been conducted and that the conclusion is to reject the null hypothesis, state the conclusion in nontechnical terms. 7) _____
- A) There is not sufficient evidence to support the claim that the mean is less than 32 miles per gallon.
 - B) There is not sufficient evidence to support the claim that the mean is greater than 32 miles per gallon.
 - C) There is sufficient evidence to support the claim that the mean is less than 32 miles per gallon.
 - D) **There is sufficient evidence to support the claim that the mean is greater than 32 miles per gallon.**
- 8) A psychologist claims that more than 21 percent of the population suffers from professional problems due to extreme shyness. Assuming that a hypothesis test to support this claim has been conducted and that the conclusion is failure to reject the null hypothesis, state the conclusion in nontechnical terms. 8) _____
- A) There is not sufficient evidence to support the claim that the true proportion is less than 21 percent.
 - B) **There is not sufficient evidence to support the claim that the true proportion is greater than 21 percent.**
 - C) There is sufficient evidence to support the claim that the true proportion is greater than 21 percent.
 - D) There is sufficient evidence to support the claim that the true proportion is less than 21 percent.
- 9) A Type I error is the mistake of _____ when it is actually true. 9) _____
- A) **rejecting the null hypothesis**
 - B) failing to reject the alternative hypothesis
 - C) failing to reject the null hypothesis
 - D) rejecting the alternative hypothesis

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

- 10) A skeptical paranormal researcher claims that the proportion of Americans that have seen a UFO is less than 5 in a thousand. Identify the type I error for the test. 10) _____
- A) Reject the claim that the proportion of Americans that have seen a UFO is equal to 5 in a thousand when that proportion is actually less than 5 in a thousand.
 - B) Fail to reject the claim that the proportion of Americans that have seen a UFO is equal to 5 in a thousand when that proportion is actually greater than 5 in a thousand.
 - C) **Reject the claim that the proportion of Americans that have seen a UFO is equal to 5 in a thousand when that proportion is actually 5 in a thousand.**
 - D) Fail to reject the claim that the proportion of Americans that have seen a UFO is equal to 5 in a thousand when that proportion is actually less than 5 in a thousand.
- 11) The owner of a football team claims that the mean attendance at games is over 59,100, and he is therefore justified in moving the team to a city with a larger stadium. Identify the type II error for the test. 11) _____
- A) **Fail to reject the claim that the mean attendance is equal to 59,100, when it is actually greater than 59,100.**
 - B) Reject the claim that the mean attendance is equal to 59,100 when it is actually 59,100.
 - C) Fail to reject the claim that the mean attendance is equal to 59,100, when it is actually less than 59,100.
 - D) Fail to reject the claim that the mean attendance is more than 59,100, when it is actually less than 59,100.

Find the P-value for the indicated hypothesis test.

- 12) A nationwide study of American homeowners revealed that 65% have one or more lawn mowers. A lawn equipment manufacturer, located in Omaha, feels the estimate is too low for households in Omaha. Find the P-value for a test to support the claim that the proportion with lawn mowers in Omaha is higher than 65%. Among 497 randomly selected homes in Omaha, 340 had one or more lawn mowers. 12) _____

A) 0.1118 B) 0.0559 C) 0.0252 D) 0.0505

Ho: $p = 0.65$ $H_1: p > 0.65$ $x = 340$ $n = 497$ Run 1PropZTest

- 13) 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 to support the airline's claim. 13) _____

A) 0.1492 B) 0.3508 C) 0.0746 D) 0.1230

Ho: $p = 0.06$ $H_1: p < 0.06$ $x = 18$ $n = 380$ Run 1PropZTest

- 14) Find the P-value for a test to support the claim that less than 50% of the people following a particular diet will experience increased energy. Of 100 randomly selected subjects who followed the diet, 47 noticed an increase in their energy level. 14) _____

A) 0.2743 B) 0.7257 C) 0.2257 D) 0.5486

Ho: $p = 0.5$ $H_1: p < 0.5$ $x = 47$ $n = 100$ Run 1PropZTest

- 15) A manufacturer claims that fewer than 6% of its products are defective. In a random sample of 97 such products, 5% are defective. Find the P-value for a test to support the manufacturer's claim. 15) _____

A) 0.1591 B) 0.3264 C) 0.3409 D) 0.1736

Ho: $p = 0.06$ $H_1: p < 0.06$ $x = 5\% \text{ of } 97 = 4.85$ round up to $x=5$, $n = 97$ Run 1PropZTest
Notice that this time the sample prop, 5%, is given. We need to find x taking 5% of the sample size. The p value on the calculator is 0.3630; since x was rounded up, the p-value output is higher than what it should be. The answer is C) 0.3409

Assume that a simple random sample has been selected from a normally distributed population and test the given claim.

- 16) Use a significance level of $\alpha = 0.01$ to test the claim that $\mu > 2.85$. The sample data consist of 9 scores for which $\bar{x} = 3.13$ and $s = 0.55$. Use the traditional method of testing hypotheses. 16) _____

A) Reject H_0 . There is sufficient evidence to support the claim that the mean is greater than 2.85.
B) Fail to reject H_0 . There is not sufficient evidence to support the claim that the mean is greater than 2.85.

Ho: $\mu = 2.85$ $H_1: \mu > 2.85$ $\bar{x} = 3.13$ $s = 0.55$. $n = 9$ Run T test Compare p value to alpha

- 17) In tests of a computer component, it is found that the mean time between failures is 520 hours. A modification is made which is supposed to increase the time between failures. Tests on a random sample of 10 modified components resulted in the following times (in hours) between failures. 17) _____

518 548 561 523 536 499 538 557 528 563

At the 0.05 significance level, test the claim that for the modified components, the mean time between failures is greater than 520 hours. Use the P-value method of testing hypotheses.

A) Reject H_0 . There is sufficient evidence to support the claim that the mean is greater than 520 hours.

B) Fail to reject H_0 . There is not sufficient evidence to support the claim that the mean is greater than 520 hours.

Ho: $\mu = 520$ $H_1: \mu > 520$ Enter data on L1 Run T test Compare p value to alpha

18) A researcher wants to test the claim that convicted burglars spend an average of 18.7 months in jail. 18) _____
She takes a random sample of 11 such cases from court files and finds that $\bar{x} = 20.6$ months and $s = 7.8$ months. Test the claim that $\mu = 18.7$ months at the 0.05 significance level. Use the traditional method of testing hypotheses.

A) Fail to reject H_0 . There is not sufficient evidence to warrant rejection of the claim that the mean is 18.7 months.

B) sufficient evidence to warrant rejection of the claim that the mean is 18.7 months.

Ho: $\mu = 18.7$ $H_1: \mu \neq 18.7$ $\bar{x} = 20.6$ $s = 7.8$ $n = 11$ Run T test Compare p value to alpha

19) A random sample of 100 pumpkins is obtained and the mean circumference is found to be 40.5 cm. 19) _____
Assuming that the *population standard deviation*, σ , is known to be 1.6 cm, use a 0.05 significance level to test the claim that the mean circumference of all pumpkins is equal to 39.9 cm.

A) Fail to reject H_0 . There is not sufficient evidence to warrant rejection of the claim that the mean equals 39.9 cm.

B) Reject H_0 . There is sufficient evidence to warrant rejection of the claim that the mean equals 39.9 cm.

Notice that sigma is given (population standard deviation; therefore, Z-Test is conducted).

Ho: $\mu = 39.9$ $H_1: \mu \neq 39.9$ $\bar{x} = 40.5$ $\sigma = 1.6$ $n = 100$

Run Z test Compare p value to alpha

Answer Key

Testname: PRACTICE05V

- 1) A
- 2) C
- 3) D
- 4) A
- 5) D
- 6) A
- 7) D
- 8) B
- 9) A
- 10) C
- 11) A
- 12) B
- 13) A
- 14) A
- 15) C
- 16) B
- 17) A
- 18) A
- 19) B