

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) A manufacturer claims that the amounts of acetaminophen in a certain brand of cold tablets have a mean of 3.3 mg. Identify the type II error for the test. 1) _____
- A) Fail to reject the claim that the mean is 3.3 mg when the mean is actually equal to 3.3 mg.
 - B) Reject the claim that the mean is 3.3 mg when it is actually different from 3.3 mg.
 - C) Fail to reject the claim that the mean is 3.3 mg when the mean is actually different from 3.3 mg.
 - D) Reject the claim that the mean is 3.3 mg when it is actually equal to 3.3 mg.

Which of the above is the Type I error?

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

- 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 (it is not 48°F). 2) _____
- | | | | |
|-----------------------------|-----------------------------|--------------------------|-----------------------------|
| A) $H_0: \mu \neq 48^\circ$ | B) $H_0: \mu \leq 48^\circ$ | C) $H_0: \mu = 48^\circ$ | D) $H_0: \mu \geq 48^\circ$ |
| $H_1: \mu = 48^\circ$ | $H_1: \mu > 48^\circ$ | $H_1: \mu \neq 48^\circ$ | $H_1: \mu < 48^\circ$ |

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.

- 3) Suppose you wish to test the claim that the mean μ different from 0. 3) _____
- Given a sample of $n = 23$ and a significance level of $\alpha = 0.05$, what criterion would be used for rejecting the null hypothesis?
- A) Reject null hypothesis if test statistic > 2.069 or < -2.069 .
 - B) Reject null hypothesis if test statistic > 1.717 or < -1.717 .
 - C) Reject null hypothesis if test statistic > 2.074 or < -2.074 .
 - D) Reject null hypothesis if test statistic > 1.717 .

- 14) 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.

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)

16) The Metropolitan Bus Company claims that the mean waiting time for a bus during rush hour is less than 8 minutes. A random sample of 20 waiting times has a mean of 6.5 minutes with a standard deviation of 2.1 minutes. At $\alpha = 0.01$, test the bus company's claim. Assume the distribution is normally distributed.

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

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) Determine 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)

- 15) A coach uses a new technique to train divers. Six divers were randomly selected and their competition scores were recorded before and after the training. The results are shown below. (Assume these are a random sample from normally distributed populations).

Subject	A	B	C	D	E	F
Before	9.5	9.7	9.7	9.6	9.4	9.7
After	9.6	9.9	9.7	9.5	9.5	10

Using a 0.01 level of significance, test the claim that the training technique is effective in raising the divers' scores.

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

b) Find the critical value(s)

c) Describe the rejection criterion in words.

d) Determine 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)