

Chapter(9)

- 1) If, in a sample of $n=25$ selected from a normal population, $X=52$ and $S=10$, what is your statistical decision if the level of significance, α , is 0.01, the null hypothesis, H_0 , is $\mu=50$, and the alternative hypothesis, H_1 , is $\mu \neq 50$? Determine the critical value(s).

The critical value(s) is(are)
(Round to four decimal places as needed. Use a comma to separate answers as needed.)

- 2) If, in a sample of $n=20$ selected from a normal population, $X=55$ and $S=20$, what is your statistical decision if the level of significance, α , is 0.10, the null hypothesis, H_0 , is $\mu=50$, and the alternative hypothesis, H_1 , is $\mu \neq 50$?

- a) Determine the critical value(s).

The critical value(s) is(are)

(Round to four decimal places as needed. Use a comma to separate answers as needed.)

- b) Determine the test statistic, t_{STAT} .

$t_{STAT} =$

(Round to four decimal places as needed.)

- c) State your statistical decision. Choose the correct answer below:

- a. The test rejects the null hypothesis. The data provide sufficient evidence to conclude that the mean differs from $\mu=50$.
 - b. The test does not reject the null hypothesis. The data provide sufficient evidence to conclude that the mean differs from $\mu=50$.
 - c. The test rejects the null hypothesis. The data does not provide sufficient evidence to conclude that the mean differs from $\mu=50$.
 - d. The test does not reject the null hypothesis. The data does not provide sufficient evidence to conclude that the mean differs from $\mu=50$.
-

- 3) If, in a sample of $n=56$ selected from a left-skewed population, $X=63$ and $S=20$, would you use the t test to test the null hypothesis $H_0: \mu=62$?

Choose the correct answer below:

- a. No, you would not use the t test because the sample size is at least 30 and the population is left-skewed.
 - b. Yes, you would use the t test because the sample size is less than 30 and this population size allows for the Central Limit Theorem to take effect.
 - c. No, you would not use the t test because the sample size is less than 30 and the population is left-skewed.
 - d. Yes, you would use the t test because the sample size is at least 30 and his population size allows for the Central Limit Theorem to take effect.
-

- 4) A factory uses machines to package candies as they move along a filling line. Although the packages are labeled as 8 ounces, the company wants the packages to contain a mean of 8.17 ounces so that virtually none of the packages contain less than 8 ounces. A sample of 50 packages is selected, and the packaging process is stopped if there is evidence that the mean amount packaged is different from 8.17 ounces. Suppose that in a particular sample of 50 packages, the mean amount is 8.171 ounces, with a sample standard deviation of 0.046 ounce.

*Is there evidence that the population mean amount is different from 8.17 ounces? (Use a 0.05 level of significance.)

1- State the null and alternative hypotheses

$H_0: \mu$

$H_1: \mu$

2-Determine the test statistic The test statistic is
(Round to four decimal places as needed.)

3- Determine the critical value t
(Type integers or decimals.)

4- State the conclusion.

(Reject H_0) (Do not reject H_0) There is insufficient evidence to conclude that the population mean amount is different from 8.17 ounces.

5) A dean at a university in India wonders if her students study less than 24 hours per week on an average. She randomly selects 35 students and enquires about the average time they spend studying per week (in hours). The collected data shows a sample mean of 17.17 hours and a sample standard deviation of 7.36 hours. If the level of significance, α , is 0.05, complete parts a through d.

(a) Determine the hypothesis to test the dean's concern. Choose the correct null and alternative hypothesis below.

- a) $H_0: \mu \geq 24$ hours; $H_1: \mu < 24$ hours
- b) $H_0: \mu = 24$ hours; $H_1: \mu \neq 24$ hours
- c) $H_0: \mu \geq 24$ hours; $H_1: \mu = 24$ hours
- d) $H_0: \mu \leq 24$ hours; $H_1: \mu > 24$ hours

(b) Determine the critical value(s).

The critical value(s) is (are)

(Round to four decimal places as needed. Use a comma to separate answers as needed.)

(c) Determine the test statistics t_{STAT} .

$t_{STAT} =$

(Round your answers to two decimal places as needed.)

(d) State your statistical decision. Choose the correct answer below:

- a. The test does not reject the null hypothesis. The data provides sufficient evidence at a 0.05 level of significance the average study time at the university is more than 24 hours per week.
- b. The test rejects the alternate hypothesis. The data provides sufficient evidence at a 5% level of significance, the average study time at the university is less than 24 hours per week.
- c. The test rejects the null hypothesis. The data provides sufficient evidence at a 5% level of significance the average study time at the university is less than 24 hours per week.
- d. The test do not rejects the alternate hypothesis. The data provides sufficient evidence at a 5% level of significance, the average study time at the university is more than 24 hours per week.

6) In a random sample of 180 items, 67 are found to be defective. If the null hypothesis states that 40% of the items in the population are defective, then what is the Z_{STAT} value?

$Z_{STAT} =$

(Round to two decimal places as needed.)

7) According to a recent report, 46% of college student internships are unpaid. A recent survey of 120 college interns at a local university found that 55 had unpaid internships. Use the five step p-value approach to hypothesis testing and a 0.01 level of significance to determine whether the proportion of college interns that had unpaid internships is different from 0.46 (Let π be the population proportion).

a- Determine the null hypothesis, H_0 , and the alternative hypothesis, H_1 .

$H_0: \pi$ $H_1: \pi$

b-What is the test statistic? $Z_{STAT} =$

(Type an integer or a decimal. Round to two decimal places as needed.)

c-What is the p-value?

The p-value is

(Type an integer or a decimal. Round to three decimal places as needed.)

d-What is the final conclusion?

There (is) (is not) sufficient evidence that the proportion of college interns that had unpaid internships is different from 0.46 because the p-value is (less than) – (greater than) the level of significance.

8) In a one -tail hypothesis test where you reject H_0 only in the upper tail,

a- what is the p-value if $Z_{stat} = + 2.00$?

b- What is your statistical decision if you test the null hypothesis at 0.05 level of significance?

9) In a one -tail hypothesis test where you reject H_0 only in the lower tail,

a- what is the p-value if $Z_{stat} = - 1.38$?

b-What is your statistical decision if you test the null hypothesis at 0.01 level of significance
