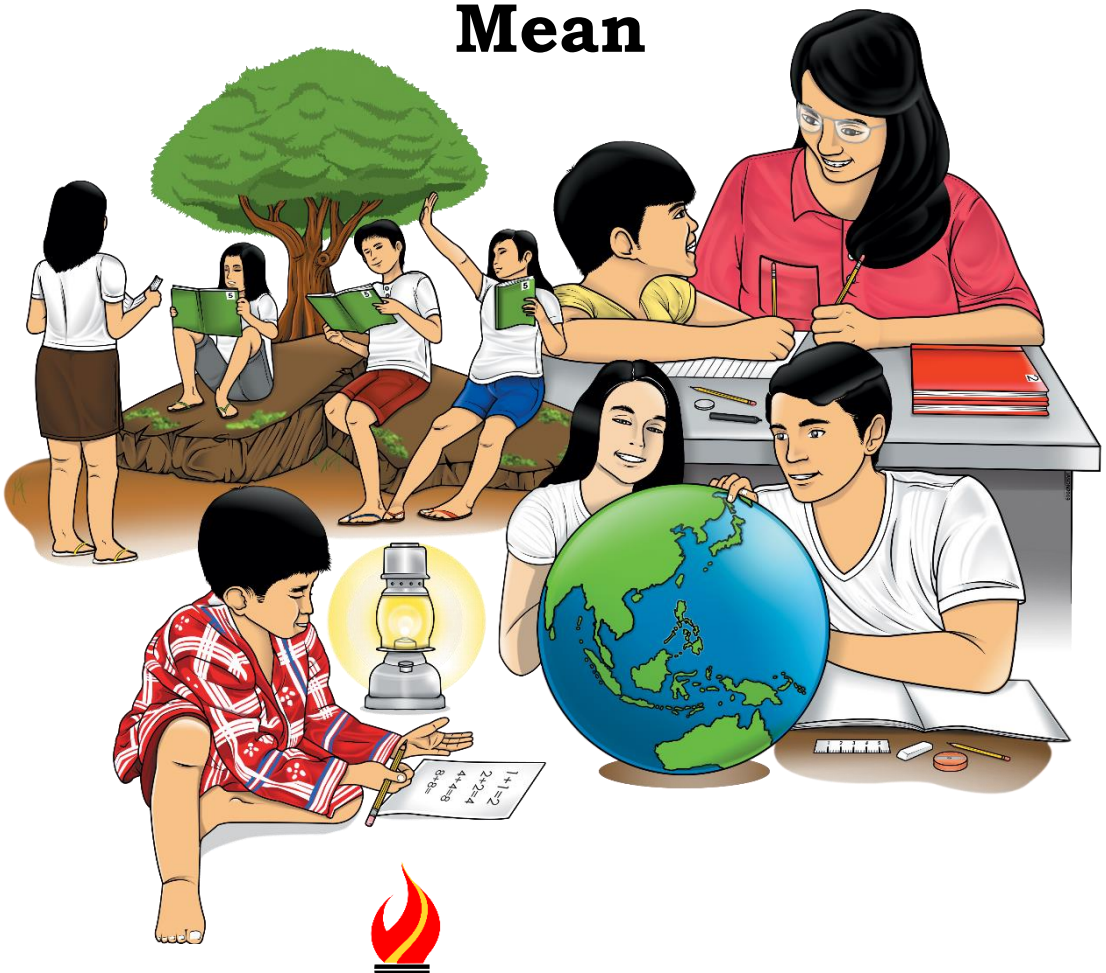
Senior High School

DepED
DEPARTMENT OF EDUCATION

Statistics and Probability

Quarter 4 – Module 8: Solving Problems Involving Test of Hypothesis on Population Mean



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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

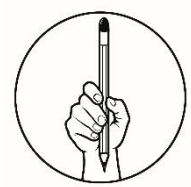
In the previous module, you studied about constructing hypotheses based on assumptions made. You've learned how to determine the appropriate test statistic to be used and solve its value in a given situation as well as how to identify the critical value and draw the critical region.

In this module, you will apply your knowledge and skills on solving problems in hypothesis testing. Eventually, you will decide whether you will reject the null hypothesis or not.

After going through this module, you are expected to:

1. identify the steps in hypothesis testing; and
2. solve problems involving test of hypothesis on the population mean.

Before you proceed to the lesson, make sure to answer first the questions on the "What I Know" portion.



What I Know

Choose the best answer to the given questions or statements. Write the letter of your choice on a separate sheet of paper.

1. Which of the following will produce a correct decision?
   a. rejecting a false hypothesis
   b. rejecting a true null hypothesis
   c. failure to reject a false hypothesis
   d. failure to reject a true null hypothesis

2. If a result is said to be significant at 5% level, what does it mean?
   a. The null hypothesis is 5% true.
   b. The null hypothesis is 5% incorrect.
   c. We fail to reject the false null hypothesis 5% of the time.
   d. There is a 5% probability that a true null hypothesis is rejected.

3. Which value separates the critical region from the non-critical region in a normal curve when testing a hypothesis?
   a. t-value
   b. z-value
   c. critical value
   d. computed value

4. What should be the decision if the computed z-value lies in the critical region?
   a. Reject the null hypothesis.
   b. Reject the alternative hypothesis.
   c. Do not reject the null hypothesis.
   d. Do not reject the alternative hypothesis.

5. The mean height of women is greater than 64" (inches). Which of the following represents the null and alternative hypotheses?
   a. H_0: $\mu \geq 64$"
      H_a: $\mu \neq 64$"
   b. H_0: $\mu > 64$"
      H_a: $\mu \neq 64$"
   c. H_0: $\mu \leq 64$"
      H_a: $\mu > 64$"
   d. H_0: $p = 64$"
      H_a: $p > 64$"

6. What is the last step in the hypothesis testing procedure?
   a. Draw conclusion.
   b. Choose the level of significance.
   c. State the null and alternative hypotheses.
   d. Determine the test statistic and compute it.

7. A one sample t-test is conducted on Ho: μ = 81.6. The sample has a sample mean = 84.1, s = 3.1, n = 25, and α = .01. State your null and alternative hypotheses.

a. H_0: μ = 81.6
   H_a: μ ≠ 81.6

b. H_0: μ = 81.6
   H_a: μ < 81.6

c. H_0: μ ≤ 81.6
   H_a: μ > 81.6

d. H_0: p = 64”
   H_a: p > 81.6

8. Perform a hypothesis test on the null hypothesis where μ = 6.9. A random sample of 25 items is selected. The sample mean is 7.1 and the sample standard deviation is 2.4. It can be assumed that the population is normally distributed at α = .01.

a. There is enough evidence to reject the claim.
b. There is enough evidence to support the claim.
c. There is no enough evidence to reject the claim.
d. There is no enough evidence to support the claim.

9. In a right-tailed test, what will you do if the critical value is greater than the computed value?

a. Reject the null hypothesis.
b. Reject the alternative hypothesis.
c. Do not reject the null hypothesis.
d. Fail to reject the alternative hypothesis.

10. When the null hypothesis is rejected, which of the following statements is true?

a. The null hypothesis is incorrect.
b. The alternative hypothesis is true.
c. There is enough evidence against the null hypothesis.
d. There is a very small probability that the given null hypothesis is true.

11. What does it mean when we failed to reject the null hypothesis?

a. The conclusion is not significant.
b. The null hypothesis is definitely correct.
c. There is enough evidence to back up the null hypothesis.
d. There is insufficient evidence to disagree with the null hypothesis.

12. If the t-computed value is 1. 093 and the critical value is 1.699, what will be the decision?

a. Reject the null hypothesis.
b. Support the null hypothesis.
c. Do not reject the null hypothesis.

d. Support the alternative hypothesis.

13. What is the first step in the hypothesis testing procedure?

a. Draw conclusion.
b. Choose the level of significance.
c. State the null and alternative hypotheses.
d. Determine the test statistic and compute it.

14. What will you do if the computed value is greater than the critical value?

a. Reject the null hypothesis.
b. Support the null hypothesis.
c. Do not reject the null hypothesis.
d. Support the alternative hypothesis.

15. If the computed z-value is 1.130 and the critical value is 1.96, what conclusion can be drawn?

a. Fail to reject the null hypothesis.
b. Reject both the null and alternative hypotheses.
c. Reject the null hypothesis in favor of the alternative hypothesis.
d. Fail to reject both the null hypothesis and alternative hypothesis.

How did you find this pre-test? Did you encounter both familiar and unfamiliar terms? Kindly compare your answer in the Answer Key on the last part of this module.

If you got a perfect score or 100%, skip this module and proceed to the next one. But if you missed even a single point, please continue with this module as it will enrich your knowledge in hypothesis testing.

Lesson 1 Solving Problems Involving Test of Hypothesis on the Population Mean

Hypothesis testing is a method of testing a claim or hypothesis about a parameter in a population using data measured in a sample. In this method, we test some hypotheses by determining the likelihood that a sample statistic could have been selected and if the hypothesis regarding the population parameter was true.

In this module, you will apply your knowledge in solving problems on hypothesis testing. To do that, recall the different terms related to hypothesis testing by answering the activity below.

What's In

Find the Word... That's the Word!

Find the words related to hypothesis testing. The letters consisting of the word may be arranged horizontally, vertically, or diagonally. Make sure to identify each of them.

A	H	Y	P	O	T	H	E	S	I	S	N	A	V	Q	N	T
L	C	W	A	A	O	A	N	S	A	I	D	Q	A	U	O	Y
T	A	N	R	D	N	S	U	Z	D	R	E	A	R	K	I	P
E	R	T	A	G	U	V	P	T	T	H	I	R	I	G	R	E
R	S	A	M	P	L	E	M	E	A	N	S	S	A	T	Y	I
N	I	R	E	Q	L	U	S	S	I	O	N	E	N	I	N	E
A	G	T	T	E	S	T	I	T	L	S	W	A	C	T	W	R
T	N	S	E	P	A	J	K	K	W	L	E	T	E	K	A	R
I	I	O	R	L	S	K	L	O	Y	O	R	O	Q	S	F	O
V	F	O	N	E	T	A	I	L	E	D	T	E	S	T	G	R
E	I	R	C	E	I	L	F	Y	G	Q	U	A	X	P	H	S
N	C	C	R	I	T	I	C	A	L	R	E	G	I	O	N	T
S	A	M	P	L	E	S	I	Z	E	I	L	I	Z	L	U	Y
I	N	A	U	D	L	R	W	O	E	L	P	Q	P	S	E	U
L	C	P	O	P	U	L	A	T	I	O	N	M	E	A	N	D
W	E	L	E	V	E	L	C	S	E	N	E	R	X	Y	L	J

Since you already know the different terms related to hypothesis testing, you are now ready to solve problems.

In decision making, what are the factors that you need to consider? Do you think of the consequences of your actions?

Statistics can help us in making decisions. Included in the process is forming reliable conclusions and the decision making starts with the testing of the hypothesis. Let us enhance your decision-making skills by answering the next activity.

What's New

Would You Rather!

Choose only one, then justify your choice.

Would you rather … be a girl or a boy?	*Would you rather …* have more siblings or be the only child?	*Would you rather …* go to college or get a job?
Would you rather … come to school or hang out with your friends?	*Would you rather …* go without Facebook or junk food for the rest of your life?	*Would you rather …* have many good friends or one very best friend?

Every day, we are faced with all sorts of decisions. Sometimes the decisions are small, like what to wear or what to eat. But sometimes the decisions are bigger, like what course you are going to take up or which university you are going to enroll in college. The test of hypothesis will aid you in the decision-making process so you can make the right choices for better results.

What is It

In testing hypothesis on the population means, follow the steps below:

1. State the null hypothesis H_o and the alternative hypothesis H_a.
2. Determine the test statistic that will be used to conduct the hypothesis test. Then, calculate its value.
3. Find the critical value for the test and draw the critical region.
4. Decide and draw a conclusion based on the comparison of the calculated value of the test statistic and the critical value of the test.

In general, if the absolute value of the computed value is greater than the absolute value of the critical value, we reject the null hypothesis and support the alternative hypothesis. But if the absolute value of the computed value is less than the absolute

value of the critical value, we fail to reject the null hypothesis and the alternative hypothesis is not supported.

In a ***right-tailed test***, if the computed value is ***greater than*** the critical value, ***we reject the null hypothesis and support the alternative hypothesis***. But if the computed value is ***less than*** the critical value, ***we fail to reject the null hypothesis and the alternative hypothesis is not supported***.

In a ***left-tailed test***, if the computed value is ***less than the critical value***, we ***reject the null hypothesis and support the alternative hypothesis***. But if the computed value is ***greater than*** the critical value, ***we fail to reject the null hypothesis and the alternative hypothesis is not supported***.

Study the given examples below.

Example 1: According to a study conducted by the Grade 12 students, ₱155 is the average monthly expense for cell phone loads of high school students in their province. A Statistics student claims that this amount has increased since January of this year. Do you think his claim is acceptable if a random sample of 50 students has an average monthly expense of ₱165 for cell phone loads? Using 5% level of significance, assume that a population standard deviation is ₱52.

Solution:

Given: $\bar{x}$ = 165 μ = 155 σ = 52 n = 50 α = 0.05

Step 1: State the null and alternative hypotheses.

H_o: μ = 155 H_a: μ > 155

Step 2: Determine the test statistic, then compute its value.
Since the population mean is being tested, the population standard deviation σ is known, and n > 30, the appropriate test statistic is the z-test.

$$z = \frac{\bar{x}-\mu}{\frac{\sigma}{\sqrt{n}}}$$

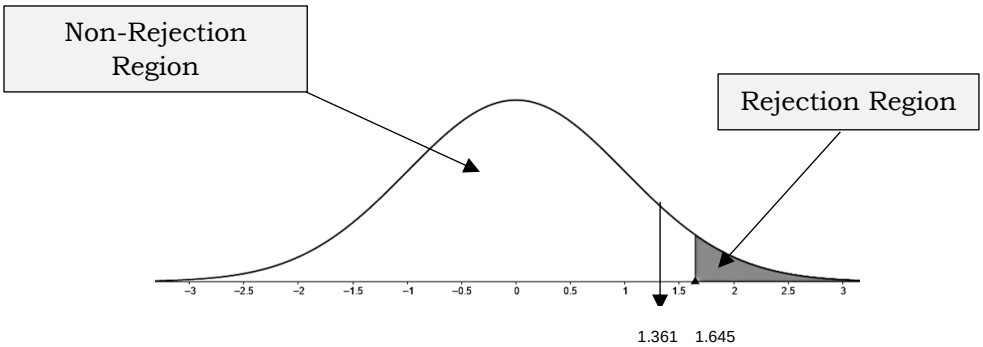
$$z = \frac{165-155}{\frac{52}{\sqrt{50}}}$$

$$z = \frac{10}{7.35}$$

$$\mathbf{z = 1.361}$$

Step 3: Find the critical value and draw the critical region. Use the z-critical value table.

The alternative hypothesis is directional. Hence, the one-tailed test (right-tailed test) shall be used. From the z-value table at 0.05 level of significance, the critical value is 1.645.



Step 4: Draw a conclusion.

The *z*-computed value is 1.361 and it lies within the non-rejection region, so we fail to reject the null hypothesis. Therefore, there is no enough evidence to support the claim that the average monthly expense for cell phone loads is more than ₱155. This result is significant at α = 0.05 level.

Example 2: Blood glucose levels for obese teenagers have a mean of 120. A researcher thinks that a diet high in raw cornstarch will have a positive or negative effect on blood glucose levels. A sample of 25 patients who have tried the raw cornstarch diet has a mean glucose level of 135 with a standard deviation of 38. Test the hypothesis at α = 0.10 that the raw cornstarch had an effect.

Solution:

Given: $\bar{x}$ = 135 μ = 120 s = 38 n = 25 α = 0.10 df = 24

Step 1: State the null and alternative hypotheses.

H_o: μ = 120 H_a: $\mu \neq 120$

Step 2: Determine the test statistic, then compute its value.

Since it is the population mean being tested, the population standard deviation is unknown, and n < 30, the appropriate test statistic is the t-test.

$$t = \frac{\bar{x}-\mu}{\frac{s}{\sqrt{n}}}$$

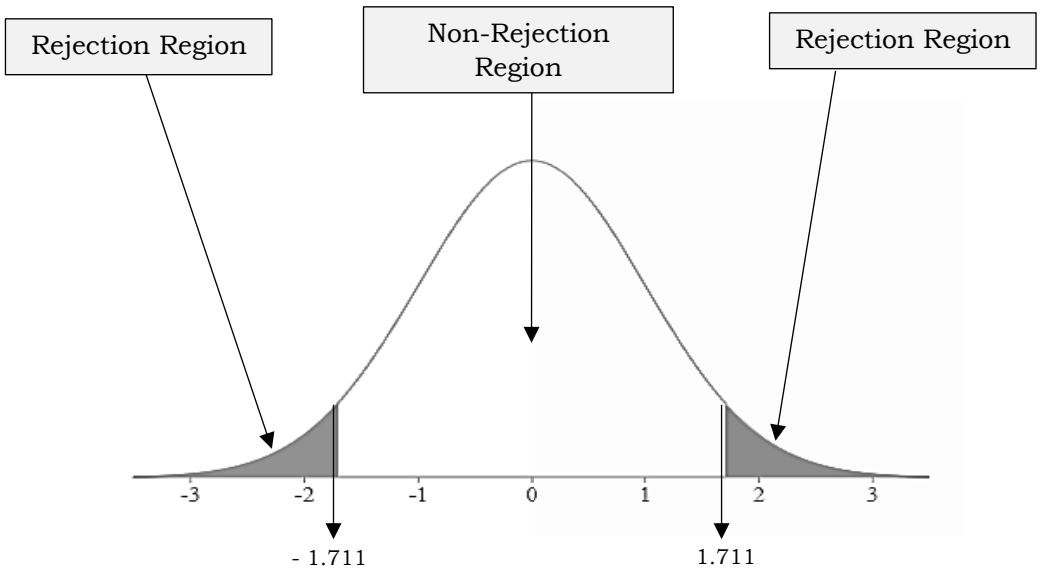
$$t = \frac{135-120}{\frac{38}{\sqrt{25}}}$$

$$t = \frac{15}{7.6}$$

$$\boldsymbol{t = 1.974}$$

Step 3: Find the critical value and draw the critical region.

The alternative hypothesis is non-directional. Hence, the two-tailed test shall be used. From the t-value table at 0.10 level of significance, the critical value is $\pm$1.711.



Step 4: Draw a conclusion.

Since the t-computed value is 1.974 which is greater than the critical value of 1.711, we reject the null hypothesis and support the alternative hypothesis. We can conclude that there is enough evidence to support the claim that the raw cornstarch had an effect on blood glucose levels.

Example 3: The average IQ of Senior High School students is 99 with a standard deviation of 15. A researcher believes that the average IQ of Senior High School students is lower. A random sample of 40 students was tested and got an average of 95. Is there enough evidence to suggest that the average IQ is lower? Test the hypothesis at 0.05 level of significance.

Solution:

Given: $\bar{x}$ = 95 μ = 99 σ = 15 n = 40 α = 0.05

Step 1: State the null and alternative hypotheses.

H_o: μ = 99 H_a: μ < 99

Step 2: Determine the test statistic, then compute its value.
Since the population mean is being tested, the population standard deviation σ is known, and n > 30, the appropriate test statistic is the z-test.

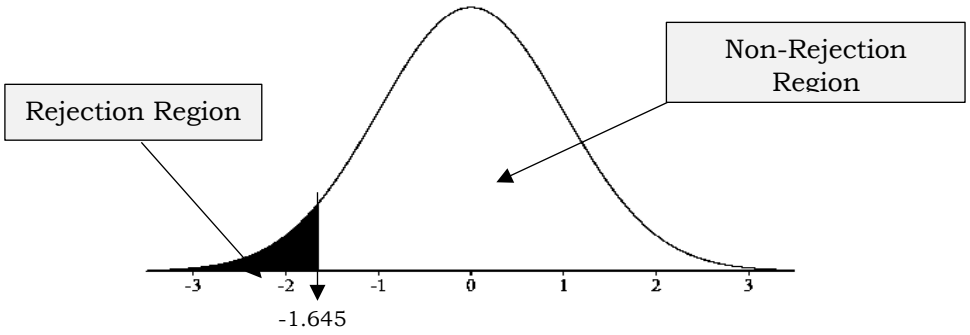
$$z = \frac{\bar{x}-\mu}{\frac{\sigma}{\sqrt{n}}}$$

$$z = \frac{95-99}{\frac{15}{\sqrt{40}}}$$

$$z = \frac{-4}{2.37}$$

$$\mathbf{z = -1.68}$$

Step 3: Find the critical value and draw the critical region. Use the z-critical value table. The alternative hypothesis is directional. Hence, the one-tailed test (left-tailed test) shall be used. From the z-value table at 0.05 level of significance, the critical value is -1.645.



Step 4: Draw a conclusion.

The z-computed value is -1.688 and it lies within the rejection region, so we reject the null hypothesis. Therefore, there is enough evidence to support the claim that the IQ level of Senior High School students is lower than 99. This result is significant at α = 0.05 level.

What's More

Activity 1: Complete Me!

Fill in the blanks.

A researcher reports that the average IQ level of students in Philippine Science High School (PSHS) is 110. A sample of 20 students has a mean IQ level of 106 with a standard deviation of 9. At 5% level of significance, test the claim that the IQ level of students in PSHS is 110.

Solution:

Given: $\bar{x}$ = ___ μ = 110 s = ___ n = ___ α = ___ df = ___

Step 1: _____

H_o: $\mu = 110$ H_a: $\mu \neq 110$

Step 2: Determine the test statistic, then compute its value.

Since n < 30, we will use_____.

$$t = \frac{\bar{x}-\mu}{\frac{s}{\sqrt{n}}}$$

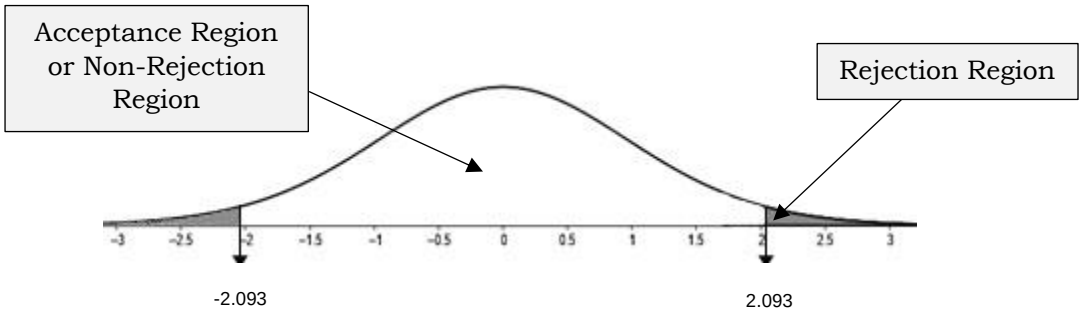
$$t = \frac{\quad}{\frac{9}{\sqrt{20}}}$$

$$t = -$$

$$t = \_\_\_$$

Step 3: _____

From the t-value table at 0.05 level of significance, the critical value is _____.



Step 4: Draw a conclusion.

Since it is a left-tailed test and the t-computed value is _____, which is _____ than the critical value of _____, we _____ the null hypothesis. We therefore conclude that _____.

Activity 2: Follow Me!

Follow the steps in testing hypothesis to answer the following problems.

1. Mapalad Integrated High School determined students' Body Mass Index (BMI) at the opening of classes. It has been recorded that the average height of female students is 154.2 centimeters with a standard deviation of 9 centimeters. A researcher conducted her own study and she randomly selected 40 female students. In her study, she got an average of 156.7 centimeters. Is there a reason to believe the claims of the school? Use 5% level of significance in testing the hypothesis.
2. The manager of a certain TV station claimed that the average rating of people watching their noontime teleserye in Manila is 62.5. A researcher randomly selected 25 people and asked them their favorite noontime teleserye. He computed the mean and obtained 67.8 with standard deviation of 15.9. Is there a reason to believe that the manager is correct? Use 0.01 as the level of significance.
3. According to the report of National Economic Development Authority (NEDA) last year, a Filipino household spends an average of ₱333 a day. You took a random sample of 20 households and determined the amount of their allotted budget each day revealing a mean of ₱420 and standard deviation of ₱120. Using 0.01 level of significance, can it be concluded that the average amount spent per day by a Filipino household has increased? Assume normality over the population.
4. One of the psychological tests conducted by the guidance counselors in a public school is the Survey of Study Habits and Attitudes (SSHA) that measures student's attitudes toward studying. The mean score of Senior

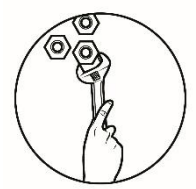
High students is 135 with standard deviation of 35. Makisig suspects that older students have better attitudes toward school. He randomly selects 50 Grade 12 students who are at least 18 years old and gives them SSHA. The test result has a mean score of 144.8 points. Is there a reason to believe that the claim of the guidance counselors is correct? Assume that the population mean score is normally distributed. Carry out a significance test at 5% level.

5. According to the World Health Organization's statistics published in 2018, the lifespan of a person in the Philippines is 67 years old. A random sample of 25 obituary notices in the Philippine Daily Inquirer has an average mean of 60 years old with a standard deviation of 19 years. If the life span in the Philippines is normally distributed, does this information indicate that the population mean life span of Filipinos is less than 67 years old? Use 5% level of significance.

What I Have Learned

Directions: Answer the following.

1. What are the steps in testing hypothesis for the population mean?
2. In a right-tailed test, what will you do if the computed value is greater than the critical value?
3. In a left-tailed test, what will you do if the computed value is less than the critical value?
4. What does it mean if you reject the null hypothesis?
5. What do you mean if you fail to reject the null hypothesis



What I Can Do

In a long bond paper, create an infographic chart about solving problems in hypothesis testing. Be creative!

Grading Rubric for Infographic Chart

Indicator	Excellent (5 points)	Good (4 points)	Fair (3 points)	Needs Improvement (2 points)
Content	All information is detailed, accurate, relevant, and properly cited.	Information is detailed, accurate, relevant, and properly cited.	Most information is detailed, accurate, relevant, and properly cited	Few information is detailed, accurate, relevant, and properly cited.
Infographic Design	Layout is aesthetically pleasing.	Layout is clear.	Layout is generally clear.	Layout maybe somewhat unclear.
Creativity	Additional elements such as pictures are incorporated to enhance the infographic.	Additional elements are used but do not enhance the infographic.	Additional elements are used but there is no relevance to the content of the infographic.	No additional elements are used.

Assessment

Choose the best answer to the given questions or statements. Write the letter of your choice on a separate sheet of paper.

1. The null hypothesis is rejected. What does it mean?
    a. The null hypothesis is incorrect.
    b. The alternative hypothesis is true.
    c. There is enough evidence against the null hypothesis.
    d. There is a very small probability that the null hypothesis is true.

2. If the t-computed value is 2.430 and the critical value is 2.011, what will be the decision?
    a. Reject the null hypothesis.
    b. Support the null hypothesis.
    c. Reject the alternative
    d. Do not reject the null hypothesis.

3. What is the third step in the hypothesis testing procedure?
    a. Draw conclusion.
    b. State the null and alternative hypotheses.
    c. Determine the test statistic and compute it.
    d. Find the critical value for the test; then draw the critical region.

4. In a left-tailed test, what will you do if the critical value is less than the computed value?
    a. Reject the null hypothesis.
    b. Do not reject the null hypothesis.
    c. Reject the alternative hypothesis.
    d. Do not reject the alternative hypothesis.

5. The t-computed value is 1.875 and the critical value is 2.080. What conclusion can be drawn?
    a. Reject the null hypothesis.
    b. Fail to reject the null hypothesis.
    c. Reject the alternative hypothesis.
    d. Fail to reject the alternative hypothesis.

6. What does it mean if a result is said to be significant at 1% level?
    a. The null hypothesis is 99% true.
    b. The null hypothesis is 99% wrong.
    c. We fail to reject the false null hypothesis 1% of the time.
    d. There is a 1% probability that a true null hypothesis is rejected.

7. It is a value that separates the acceptance region from the rejection region in a normal curve when testing the hypothesis?
    a.t-value c. critical value
    b.z-value d. computed value

8. What should you do if the computed z-value lies in the critical region?
    a. Reject the null hypothesis.
    b. Reject the alternative hypothesis.
    c. Do not reject the null hypothesis.
    d. Do not reject the alternative hypothesis.

9. The mean height of women is less than 64" (inches). Which of the following represents the null and alternative hypotheses?
    a. H_0: $\mu \geq 64"$
       H_a: $\mu < 64"$
    c. H_0: $\mu \leq 64"$
       H_a: $\mu \neq 64"$
    b. H_0: $\mu = 64"$
       H_a: $\mu \neq 64"$
    d. H_0: $p = 64"$
       H_a: $p > 64"$

10. In the hypothesis testing procedure, drawing conclusion should always be the _____ step.

    a. first b. second c. third d. last

11. A one sample t-test is conducted on Ho: $\mu = 81.6$. The sample has a mean of 84.1, $s = 3.1$, $n = 25$, and $\alpha = .01$. What conclusion can be drawn?

    a. Reject H_o. c. Fail to reject H_o.
    b. Reject H_a. d. Fail to reject H_a.

12. Perform a hypothesis test where the null hypothesis is that the $\mu = 6.9$. A random sample of 16 items is selected. The sample mean is 7.1 and the sample standard deviation is 2.4. It can be assumed that the population is normally distributed at $\alpha = 0.05$.

    a. There is enough evidence to reject the claim.
    b. There is enough evidence to support the claim.
    c. There is not enough evidence to reject the claim.
    d. There is not enough evidence to support the claim.

13. If the computed t-value is 2.130 while the critical value is 2.086, what conclusion can be drawn?

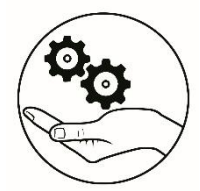
    a. Reject both the null and alternative hypotheses.
    b. Fail to reject the null and alternative hypotheses.
    c. Reject the null hypothesis in favor of the alternative hypothesis.
    d. Fail to reject the null and the alternative hypothesis is not supported.

14. After formulating the hypotheses, what is the next step in the hypothesis testing procedure?

    a. Draw conclusion.
    b. Choose the level of significance.
    c. Determine the test statistic and compute it.
    d. Find the critical value and draw the critical region.

15. Find the critical value(s) for a two-tailed test with $\alpha = 0.05$.

    a. $z = -1.65$ b. $z = \pm 0.06$ c. $z = 1.65$ d. $z = \pm 1.96$



Additional Activities

In this activity, complete the1-4-3 chart by writing down what are being asked.

1 – 4 – 3 LIST
One (1) thing I really love about this topic:
1.
Four (4) important reasons why I love this topic:
1.
2.
3.
4.
Three (3) things I still need to understand about this topic:
1.
2.
3.

Answer Key

What I Know

1. D	9. C
2. D	10. C
3. C	11. D
4. A	12. C
5. C	13. C
6. A	14. A
7. A	15. A
8. C	

What's In
(Find the Word… That's the Word)

There are 14 words related to hypothesis testing. Students may answer only 10 words (in any order).

1. Hypothesis
2. Two-tailed
3. Parameter
4. Significance level
5. Z test
6. Variance
7. T test
8. Sample mean
9. Population mean
10. Type I error
11. Alternative
12. Sample size
13. One-tailed test
14. Critical region

Note: Tell the students to identify the terms they found.

What's More (Complete Me)

Given:

$\bar{x}$ = *106* μ = 110 s = *9* n = *20* α = 0.05 df = 19

Step 1: *State the null and alternative hypotheses.* $H_o: \mu = 110$ $H_a: \mu \neq 110$

Step 2: Determine the test statistic, then compute it. Since n < 30, we will use *t-test*.

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$$

$$t = \frac{\mathbf{106 - 110}}{\frac{9}{\sqrt{20}}}$$

$$t = \frac{-4}{\mathbf{2.01}}$$

$$\boldsymbol{t = -1.990}$$

Step 3: *Find the critical value.* From the t-value table at 0.05 level of significance and df =19, the critical value is *2.093 or -2.093*.

Step 4: Draw conclusion.

Since it is a left-tailed test and the t-computed value is *-1.990* which is greater than the critical value of *-2.093*, we *fail to reject* the null hypothesis. We therefore conclude that *there is not enough evidence to reject the claim that the IQ level of the students in PSHS is 110*.

What's More (Follow Me)

1. ***Given:*** $\bar{x}$ = 156.7 μ = 154.2 σ = 9 n = 40 α = 0.05

Step 1: State the null and alternative hypotheses.

H_o: μ = 154.2 H_a: $\mu \neq$154. 2

Step 2: Compute for the test statistic. z_{com} = 1.761

Step 3: Find the critical value for the test. z_{cri} =1.96

Step 4: Draw conclusion.

Since the z-computed value is less than the z-critical value, then we fail to reject the null hypothesis and the alternative hypothesis is not supported. Therefore, we conclude that there is not enough evidence to reject the claim that the average height of female students is equal to 154.2 centimeters.

2. ***Given:*** $\bar{x}$ = 67.8 μ = 62.5 s = 15.9 n = 25 α = 0.01 df= 24

Step 1: State the null and alternative hypotheses.

H_o: μ = 62.5 H_a: $\mu \neq$ 62.5

Step 2: Compute for the test statistic. t_{com} = 1.667

Step 3: Find the critical value for the test. t = 2.797

Step 4: Draw conclusion.

Since the t-computed value is less than the t-critical value, then we fail to reject the null hypothesis and the alternative hypothesis is not supported. Therefore, we conclude that there is no enough evidence to reject the claim of the manager that the average rating of people watching their noon time teleserye in Manila is 62.5.

What's More (Follow Me)

3. ***Given:*** $\bar{x}$ = 420 μ = 333 s = 120 n = 20 α = 0.01 df= 19

Step 1: State the null and alternative hypotheses.

H_o: μ = 333 H_a: μ > 333

Step 2: Compute for the test statistic. t_{com} = 3. 243

Step 3: Find the critical value for the test. t = 2. 539

Step 4: Draw conclusion.

Since the t-computed value is greater than the t-critical value, then we reject the null hypothesis in favor of the alternative hypothesis. Therefore, we conclude that there is enough evidence to support the claim that the average amount spent per day by a Filipino household has increased.

4. ***Given:*** $\bar{x}$ = 144.8 μ = 135 σ = 35 n = 50 α = 0.05

Step 1: State the null and alternative hypotheses.

H_o: μ = 135 H_a: μ > 135

Step 2: Compute for the test statistic. z_{com} = 1. 980

Step 3: Find the critical value for the test. z = 1. 645

Step 4: Draw conclusion.

Since the z-computed value is greater than the z-critical value, then we reject the null hypothesis and support the alternative hypothesis. Therefore, we conclude that there is enough evidence to reject the claim of the guidance counselors that the average of Senior High students in the SSHA is 135.

Assessment

1. C	9. A
2. A	10. D
3. D	11. A
4. B	12. C
5. B	13. C
6. D	14. C
7. C	15. D
8. A	

What's More (Follow Me)

5. ***Given:*** $\bar{x}$ = 60 μ = 67 s = 19 n = 25 α = 0.05 df = 24

Step 1: State the null and alternative hypotheses.

$H_o: \mu = 67$ $H_a: \mu < 67$

Step 2: Compute for the test statistic. t_{com} = -1. 842

Step 3: Find the critical value for the test. t = -1. 711

Step 4: Draw conclusion.

Since it is a left-tailed test and the t-computed value is less than the t-critical value, then we reject the null hypothesis and support the alternative hypothesis. Therefore, we conclude that there is enough evidence to support the claim that the lifespan of Filipinos is less than 67 years old.

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