

Statistics and Probability Quarter 4 – Module 13: **Drawing Conclusions About Population Proportion Based on Test Statistic Value and Rejection** Region



Statistics and Probability – Grade 11 Alternative Delivery Mode Quarter 4 – Module 13: Drawing Conclusions About Population Proportion Based on Test Statistic Value and Rejection Region

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Statistics and Probability

Module 13: Drawing Conclusions About Population Proportion Based on Test Statistic Value and Rejection Region



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-bystep 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 conducting a study, the last part of the process is drawing conclusions and it should be done correctly and carefully. In doing so, you need to learn how to consider necessary data as your basis and follow different steps.

On the previous lessons, you were already taught how to compute test statistic concerning population proportions as well as how to determine the rejection or non-rejection region by using an illustration on a curve.

After going through this module, you are expected to:

- 1. compute for the test statistic of population proportion;
- 2. differentiate critical value approach from p-value approach of hypothesis testing; and draw conclusions on population proportions based on the test statistic and the rejection region



What I Know

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

- 1. What do you call the part of the sample or the proportion of individuals in a sample sharing a certain trait?
 - a. sample mean
 - b. sample variance
 - c. sample proportion
 - d. sample standard deviation
- 2. Which of the statements is NOT true about rejection region?
 - a. This is also the critical region.
 - b. It tells the researcher if a certain theory is probably true.
 - c. This is the range of values of the test value where the null hypothesis should be rejected.
 - d. This is the range of values of the test value where the null hypothesis should fail to be rejected.
- 3. Which of the following is usually expressed as a fraction, decimal, or percentage of the whole population which has a certain trait or characteristic?
 - a. sample mean
 - b. population mean
 - c. sample proportion
 - d. population proportion
- 4. Which of the following symbols is NOT used in computing the z-value?

a. \hat{p} b. n c. p d. α

- 5. What is the first step in drawing your conclusions?
 - a. Identify the correct decision.
 - b. Compute the test statistic.
 - c. Determine the level of significance.
 - d. Formulate the null and alternative hypothesis.
- 6. An insurance industry report indicated that 30% of those persons involved in minor traffic accidents this year have been involved in at least one traffic accident in the last five years. Believing it was too large, an advisory group decided to investigate this claim. A sample of 200 traffic accidents this year showed that 56 persons were also involved in another accident in the last five years.

What is the value of **p** in the given problem?

- a. 200
- b. 56
- c. 0.70
- d. 0.30
- 7. When the computed z-value (z_{com}) is 3.16 at α = 0.05 level of significance, which of the following will be the correct decision?
 - a. Reject the null hypothesis.
 - b. Fail to reject the null hypothesis.
 - c. Reject the alternative hypothesis.
 - d. Accept the alternative hypothesis.
- 8. Which of the following is an acceptable reason to conclude that there is enough evidence for the null hypothesis to **NOT be rejected**?
 - a. The computed z-value falls on the rejection region.
 - b. The computed z-value does not fall on the rejection region.
 - c. The computed z-value is greater than the critical value (if there is a positive sign).

d. The computed z-value is less than the critical value (if there is a negative sign).

9. What is the relationship between a Type I error and the null hypothesis (H_0) ?

- a. A Type I error corresponds to rejecting the null hypothesis when it is true.
- b. A Type I error corresponds to rejecting the null hypothesis when it is false.
- c. A Type I error corresponds to failing to reject the null hypothesis when it is false.
- d. A Type I error corresponds to failing to reject the null hypothesis when it is true.
- 10. What distribution do we use when testing claims about population proportions?

a.	F	c. t
b.	Z	d. ch

11. Researchers used the given data below and the results to test the claim that more than 50% of adults support the tax increase.

n = 200	$\hat{p} = 56.5$
$H_{o}: p = 0.5$	H _a : p > 0.5
z≈1.84	P-value of approximately 0.033

What should be the correct conclusion?

a. At α = 0.01 significance level, you should conclude that less than 50% of adults support the tax increase.

- b. At α = 0.05 significance level, you should conclude that less than 50% of adults support the tax increase.
- c. At α = 0.05 significance level, you should conclude that more than 50% of adults support the tax increase.
- d. At α = 0.01 significance level, you should conclude that more than 50% of adults support the tax increase.

For numbers 12-15, refer to the following:

 H_o : The proportion of barangays segregating wastes into biodegradable and non-biodegradable is 45%. (H_o : p = 0.45)

H_a: The proportion of barangays segregating wastes into biodegradable and non-biodegradable *has changed* to 45%.
 α = 0.05 level

Computed z-value: $z_{com} = 2.37$ Critical z-value: $z_{tab} = 1.96$

12. What is the correct alternative hypothesis (H_a) in symbols?

a.	$H_a : p < 0.45$	c. H _a	:	p =	0.45
b.	H_a : p > 0.45	d. Ha	:	p≠	0.45

13. The given problem is a _____

a. one-tailed testc. non-directionalb. one-sided testd. cannot be determined

14. What is the correct decision based on the given results?

- a. There is no possible decision.
- b. Reject the null hypothesis.
- c. Fail to reject the null hypothesis.
- d. Change the alternative hypothesis.

15. What is the phrase that best completes the conclusion below?

Therefore, we conclude that at 0.05 level of significance, to conclude that the proportion of barangays segregating wastes into biodegradable and non-biodegradable *has changed* to 45%.

- a. there was a problem
- b. there was a missing data
- c. there was enough evidence
- d. there was not enough evidence

Drawing Conclusions about Population Proportion Based on Test Statistic Value and Rejection Region

What's In

Activity 1: Do You Love Math?

Lesson

Determine the value of sample proportion (\hat{p}) using the given sample size (n) and the number of elements or observed values (X). Each number has a corresponding letter below. After you solve for \hat{P} , write its corresponding value and letter on the blanks to decode the secret message. The formula to be used is provided in the box below.

		FORMULA: $\hat{p} = \frac{x}{n}$	
1. n = 100	; X = 48	<i>p̂</i> =	
2. n = 225	; $X = 214$	<i>p̂</i> =	
3. n = 450	; X = 356	$\hat{P} = _$	
4. n = 1000	; $X = 772$	$\hat{P} = _$	
5. n = 1330	; X = 988	$\hat{P} = _$	
6. n = 2020	; X = 1915	$\hat{P} = _$	
7. n = 2500	; $X = 2301$	$\hat{P} = _$	
8. n = 3 000	; $X = 2650$	$\hat{P} = _$	
9. n = 3 800	; X = 3316	$\hat{P} = _$	
10.n = 10 000	; X = 8900	\hat{P} =	
LEGEND:			

E – 0.95	W - 0.48	M – 0.92
A – 0.88	L- 0.79	O – 0.77
H – 0.89	T- 0.87	V- 0.74

Guide Questions:

- 1. How did you find the activity?
- 2. Did you find it easy to decode the secret message?
- 3. What is the range of values of your answer to each item?
- 4. What do you mean by \hat{p} ?
- 5. How did you get the value of \hat{p} in each item?



What's New

Activity 2: What's the Decision?

Using the given conditions, write your decision whether to <u>reject</u> or <u>fail to reject</u> the null hypothesis.

- 1. P-value is greater than $\alpha = 0.01$.
- 2. The computed value does not fall in the rejection region.
- 3. There is **enough** evidence to support the claim that there is an increase in the population proportion at the alpha level of significance.
- 4. The test statistic falls in the critical region.
- 5. _____





In drawing conclusions, there are two different approaches that you may apply: the critical z-approach (computed z-value) and the P-value approach.

CRITICAL VALUE APPROACH

In applying the first approach which is determining the critical value (which you were already taught in the previous modules), you need to consider the following:

- a. Null and Alternative Hypotheses;
- b. Level of Significance (a);
- c. Computed Test Statistic, Critical Value (including rejection region); and
- d. Decision (whether to *reject* or *fail to reject* the null hypothesis (H_o).

Determine if the test statistic falls in the rejection region. If it does, reject the null hypothesis. If it does not, do not reject the null hypothesis.

- ❖ If the computed z-statistic (z_{com}) is > or < the tabular value (z_{tab}), <u>reject</u> the null hypothesis (H_o).
- ✤ If the computed z-statistic (z_{com}) falls in the rejection region, <u>reject</u> the null hypothesis (H_o).
- ✤ If the computed z-statistic (z_{com}) does not fall in the rejection region, <u>fail to reject</u> the null hypothesis (H_o).

Illustrative Example:

Example 1

- a. H_o : p = 0.85
 - $H_a: p < 0.85$
- b. Level of Significance: $\alpha = 0.01$
- c. Computed Test Statistic:

The alternative hypothesis is *directional*. Hence, one-tailed test shall be used.

Using the Areas Under the Normal Curve Table, the critical value is -2.326 at $\alpha = 0.01$ level. There is a *negative sign* in the value due to the direction of the alternative hypothesis.

d. **DECISION**: Since the computed test statistic (z_{com}) z = -2.24 **does not fall** in the rejection region, **fail to reject** the null hypothesis (H_o).

CONCLUSION: Therefore, at 0.01 level of significance, there is <u>not enough</u> evidence to conclude that there is a decrease in the number of students who prefer male rather than female candidates.

P-VALUE APPROACH

What is P-value?

In critical value approach, a test statistic is compared with a critical value. However, in p-value approach (short for probability value), probabilities or areas are compared. P-value measures the consistency of the sample statistics with the null hypothesis. High P-values mean that sample results are consistent with a true null hypothesis while low P-values are not consistent. If the P value is small enough, we can conclude that the sample is so incompatible with the null hypothesis. Therefore, we can reject the null hypothesis for the entire population.

P-value approach uses the following basic procedures:

- 1. State the null hypothesis H_0 and the alternative hypothesis H_a .
- 2. Set the level of significance α .
- 3. Calculate the test statistic.
- 4. Calculate the *p*-value.
- 5. Make a decision. Check whether to reject the null hypothesis by comparing p-value to a.
 - If the *p*-value $< \alpha$, then reject H_o . Otherwise, do not reject H_o .

Illustrative Example:

Given:

H_o: p = 0.5 $\alpha = 0.05$ n = 25,468H_a: p > 0.5Solution:

Using the formula:

$$Z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}}$$
$$Z = \frac{0.5172 - 0.5}{\sqrt{\frac{(0.5)(0.5)}{25468}}}$$

The *p*-value is represented in the graph below:



CONCLUSION: Because the *p*-value is smaller than the significance level α =0.05, we can reject the null hypothesis. Again, we would say that there is sufficient/enough evidence to conclude that boys are more common than girls in the entire population at α =0.05 level.

As should always be the case, the two approaches (critical value approach and *p*-value approach) lead to the same conclusion.

OTHER ILLUSTRATIVE EXAMPLES USING TWO-TAILED TEST Example 1

Given:

- a. n= 50
- b. α = 0.01 significance level
- c. H_0 : The proportion of students that want to go to the zoo is 85%.

 $(H_{0:} p = 0.85)$

*H*_a: The proportion of students that want to go to the zoo is not 85%. (*H*_a: $p \neq 0.85$)



DECISION/CONCLUSION: Because $p > \alpha$, we fail to reject the null hypothesis. There is insufficient evidence to suggest that the proportion of students that want to go to the zoo is not 85%.

Example 2

Given:

- a. n= 150
- b. α = 0.1 significance level
- c. H_o : The proportion of households that have three or more cell phones is 30%. ($H_o: p = 0.3$)
 - H_a : The proportion of households that have three or more cell phones is different from 30%. ($H_a: p \neq 0.3$)
- d. $\hat{p} = 0.287$

e.
$$Z_{com} = 0.347$$



DECISION/CONCLUSION: Fail to reject the null hypothesis (*H*_o). There is insufficient evidence supporting that the proportion of households with three or more cell phones is different from 30%.

NOTE:

Conclusions are answers in sentence form which include: 1) whether there is enough evidence or not (based on the decision); 2) the level of significance; and 3) whether the original claim is supported or rejected.

Conclusions are based on the original claim which may be the null or alternative hypothesis. The decisions are always based on the null hypothesis.

	Original Claim			
Decision	Ho "REJECT"	H _a "SUPPORT"		
Reject H₀ "SUFFICIENT"	There is sufficient evidence at the alpha level of significance to reject the claim that <i>(insert original claim here).</i>	There is sufficient evidence at the alpha level of significance to support the claim that <i>(insert</i> <i>original claim here)</i> .		
Fail to reject H₀ "INSUFFICIENT"	There is insufficient evidence at the alpha level of significance to reject the claim that <i>(insert original claim here).</i>	There is insufficient evidence at the alpha level of significance to support the claim that <i>(insert original claim here)</i> .		

NOTE:

If the null hypothesis isn't rejected, this doesn't necessarily mean that it's true. It simply means that *there is not enough evidence* to justify rejecting it.

The hypothesis-testing procedure leads to the acceptance of H_0 when H_0 is true and the rejection of H_0 when H_0 is false. Unfortunately, since hypothesis tests are based on sample information, the possibility of errors must be considered. A Type I error corresponds to rejecting H_0 when H_0 is actually true, while a Type II error corresponds to accepting H_0 when H_0 is false.





What's More

Activity 3: Fill It Up!

- Compute the test statistic. Fill in the blank with the word <u>**REJECT**</u> if the decision is to reject the null hypothesis. Otherwise, write <u>**FAIL TO REJECT**</u>. Then, draw your own conclusions by completing the statement.
 - 1. In a public senior high school, a survey conducted last year by a Health Officer showed that 12% of the students drink alcohol. This year, a new survey was conducted randomly on 500 students from the same school. It was found that 97 of them drink alcohol. Test if the claim was **higher** at $\alpha = 0.01$ level.
 - a. $H_o: p = 0.12$
 - $H_a: p < 0.12$
 - b. Level of Significance: $\alpha = 0.01$
 - c. Computed Test Statistic: $z_{com} =$
 - d. Critical Value: 2.326
 - e. **DECISION**: Since the computed test statistic $z_{com} = _____ falls$ in the rejection region, ______ the null hypothesis (H_o).

CONCLUSION: Therefore, we conclude that at 0.01 level of significance, _________ evidence to claim that _______

- 2. A research states that 28% of college degrees are from engineering courses. A researcher doesn't believe that this is correct. A sample of 1,000 graduates was used and it was found out that 295 have finished engineering courses. Test the claim if it has **increased** at $\alpha = 0.10$ level. What is the correct null hypothesis?
 - a. $H_o: p = 0.28$
 - $H_a: p > 0.28$
 - b. Level of Significance: $\alpha = 0.10$
 - c. Computed Test Statistic: $z_{com} =$ ____
 - d. Critical Value: 1.282
 - e. **DECISION**: Since the computed test statistic $z_{com} = _____ does not fall in the rejection region, ______ the null hypothesis (H_o).$

CONCLUSION: Therefore, we conclude that at 0.10 level of significance, evidence to conclude that

Activity 4: Decide Now, Conclude Later!

Using the given hypotheses, computed z-value, and level of significance, make your own decision and conclusion. Then, complete the statement by filling in the blank with the appropriate word/s. The first one was done for you as a guide.

Guide:

Given:

- H_o : The proportion of students who are overweight is 25%. (H_o : p = .25).
- H_a : The proportion of students who are overweight is less than 25%.

 $(H_o: p < .25)$

 α = 0.05; Critical Value of -1.645

Computed z-statistics: $z_c = -2.24$

DECISION: Reject the null hypothesis (H_o).

Since the computed z- statistic -2.24 **falls** in the rejection region, <u>reject</u> the null hypothesis (H_0).

CONCLUSION: Therefore, we conclude at 0.05 level of significance that there is enough evidence on the claim that less than 25% of the students are overweight.

Problem 1

Given:

- $H_o:$ The proportion of employees in a shoe factory who smoke cigarette is 30%. ($H_o:\ p$ = .30)
- H_a : The proportion of employees in a shoe factory who smoke cigarette has increased to 30%. ($H_o:\ p>.30)$ α = 0.01

Computed z-statistic: $z_{com} = 2.56$ and Critical z-value: $z_{tab} = 1.282$

DECISION: Since the computed test statistic $z_{com} = 2.56$ ______ in the rejection region, ______ the null hypothesis (H_o).

CONCLUSION: Therefore, we conclude that at 0.01 level of significance, evidence to conclude that



What I Have Learned

Complete the following statements. In sentences no. 2, 5, and 6, choose from the word/s in the parentheses that best complete/s the statement.

- 1. ______ are statements which answer whether there is enough evidence or not (based on the decision), what the level of significance is, and whether the original claim is supported or rejected.
- 2. After computing the test statistic in order to draw the conclusion, just remember the following:
- a. If the computed z-statistic (z_{com}) is > or < the tabular value (z_{tab}), ______ (*fail to reject/reject*) the null hypothesis (H_o).
- b. If the computed z-statistic (z_{com}) falls in the rejection region, _______ *(fail to reject/reject)* the null hypothesis (H_o).
- 3. The decision is always based on the ______ hypothesis.
- 4. The two approaches to draw conclusions are ______.
- 5. If the *p*-value $< \alpha$, then ______ (fail to reject/reject) H_{o.}
- 6. If the *p*-value > α , then ______ (fail to reject/reject) H_{o.}



What I Can Do

Read job vacancies posts on the classified ads section of a newspaper. Then, draw conclusions about the type of people who will apply foreach job. Write your conclusions based on facts and include the newspaper clippings where you got the information. You will be graded using the given rubric below.

RUBRIC

CATEGORY	4	3	2	1
Focus and Support for Topic	There is a clear and well- focused topic which is relevant and supported	The idea is clear but the supporting details/facts are not complete.	The idea is quite clear and not supported with needed details/facts.	The idea is not clear and not supported with needed details/facts.

	with details/facts.			
Conclusion	The conclusion is correct and strong.	The conclusion is correct but quite weak.	The conclusion is incorrect but portrays a strong point.	The conclusion is weak and incorrect.
Grammar & Spelling	There are no errors in grammar or spelling.	There are 1-3 errors in grammar or spelling.	There are 4-6 errors in grammar or spelling.	There are more than 6 errors in grammar or spelling.



Assessment

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 is an approach in drawing conclusions wherein a test statistic is compared with a critical value?
 - a. critical value approach
 - b. sampling approach
 - c. two-way approach
 - d. p-value approach
- 2. Which is the correct decision for the given values/results below?

 $H_o: p = 0.13$ $H_a: p < 0.13$ a = 0.05 $Z_{com} = -2.688$

 $Z_{\rm com} = -2.688$ p-value = 0.0036

- a. There is no possible decision.
- b. Reject the null hypothesis.
- c. Fail to reject the null hypothesis.
- d. Change the alternative hypothesis.

For numbers 3 to 7, refer to the given problem below.

A state university wants to increase its retention rate of 4% for graduating students from the previous year. After implementing several new programs during the last two years, the university reevaluated its retention rate using a random sample of 352 students and found the retention rate at 5%.

- 3. Which is the correct pair of hypotheses?
 - a. H_0 : p = 0.04; H_a p > 0.04 b. H_0 : p = 0.04; H_a p < 0.04 c. H_0 : p = 0.04; H_a : p \neq 0.04
 - d. H_0 : p = 0.04; H_a : p ≥ 0.04

4. What is the value of z?

a.	-1.07	c. 1.07
b.	0.96	d. 2.59

5. What is the p-value?

a.	0.8577	c. 0.2215
b.	0.2846	d. 0.1685

- 6. What is the correct decision?
 - a. There is no possible decision.
 - b. Reject the null hypothesis.
 - c. Fail to reject the null hypothesis.
 - d. Change the alternative hypothesis.

7. What should be the conclusion based on the computed test statistic?

- a. This data shows that less than 4% of the students are retained. There is enough evidence.
 - b. This data shows that more than 4% of the students are retained. There is enough evidence.
 - c. This data does not show that less than 4% of students are retained. There is not enough evidence.
 - d. This data does not show that more than 4% of students are retained. there is not enough evidence.

For numbers 8-11, refer to the given problem below.

Suppose a study found that 68% of the population owns a home. In a random sample of 150 households, 92 own a home. Use a = 0.01 to determine that there is a decrease in the proportion of population that owns a home.

c. 0.08
d. 1.75

9. Which value is closest to the p-value?

a.	0.02	c. 0.06
b.	0.04	d. 0.08

- 10. What is the correct decision?
 - a. It cannot be concluded.
 - b. Reject the null hypothesis.
 - c. Fail to reject the null hypothesis.
 - d. Accept both null and alternative hypotheses.
- 11. Is there enough evidence to reject the claim?
 - a. There is enough evidence to reject the claim that 68% of the population owns a home.
 - b. There is enough evidence to reject the claim that 32% of the population owns a home.
 - c. There is not enough evidence to reject the claim that 32% of the population owns a home.
 - d. There is not enough evidence to reject the claim that 68% of the population owns a home.

For numbers 12-15, refer to the given problem below.

Suppose that the percentage of female physicians is 27%. In a survey of physicians, 45 of 120 are women. Is there sufficient evidence at a = 0.01 to claim that the proportion of women physicians is greater than 27%?

12. Choose the correct hypotheses.

a. H_0 : p = 0.27;	<i>H</i> _a : p > 0.27
b. H_0 : p = 0.27;	<i>H</i> _a : p < 0.27
c. H_0 : p = 0.27;	<i>H</i> _a : p ≠ 0.27
d. H_0 : p > 0.27;	<i>H</i> _a : p = 0.27

13. What is the value of *z*?

a.	-2.59	c. 0.005
b.	-0.005	d. 2.59

14. Which is closest to the p-value?

a.	0.0005	c. 0.05
b.	0.005	d. 0.5

- 15. What is the correct decision and conclusion?
 - a. Change the alternative hypothesis.
 - b. There are no possible decision and conclusion.
 - c. Reject the null hypothesis because there is enough evidence to support the claim that the proportion of women physicians is greater than 27%.
 - d. Fail to reject the null hypothesis because there is not enough evidence to support the claim that the proportion of women physicians is greater than 27%.



Additional Activities

- **Directions:** Read and analyze the following statements. Write <u>ACCEPT</u> if the statement is correct and write <u>REJECT</u> if it is incorrect. Write your answer on a sheet of paper.
 - 1. The claim being assessed in a hypothesis test is the null hypothesis.
 - 2. Critical value is the probability that the null hypothesis is true given the observed results.
 - _____3. In a research report, the results of a hypothesis test include the expression "z=3.15, p<0.01". This means that the test failed to reject the null hypothesis at $\alpha = 0.01$.
 - _____4. When p-value is greater than alpha (0.05 used), we fail to reject H_0 .
 - 5. If a hypothesis test leads to a decision failing to reject the null hypothesis, a Type II error may have been made.

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that at 0.10 level of enough evidence to claim se graduates who have		
that at 0.01 level of Igh evidence to claim that Its who drink alcohol in a as higher by 12%.	 I. Fail to reject 2. Fail to reject 3. Reject 4. Reject 	
	Activity: Fill It Up! 4. z _{com} = 4.8 reject	Activity 2: What's the Decision
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Answer Key

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References

Books

- Albacea, Zita VJ., Mark John V. Ayaay, Isidoro P. David, and Imelda E. De Mesa. *Teaching Guide for Senior High School: Statistics and Probability*. Quezon City: Commission on Higher Education, 2016.
- Caraan, Avelino Jr S. Introduction to Statistics & Probability: Modular Approach. Mandaluyong City: Jose Rizal University Press, 2011.
- De Guzman, Danilo. Statistics and Probability. Quezon City: C & E Publishing Inc., 2017.
- Punzalan, Joyce Raymond B. Senior High School Statistics and Probability. Malaysia: Oxford Publishing, 2018.
- Sirug, Winston S. Statistics and Probability for Senior High School CORE Subject A Comprehensive Approach K to 12 Curriculum Compliant. Manila: Mindshapers Co., Inc., 2017.

Online Resources

- Minitab.com. "About the Null and Alternative Hypotheses." Accessed February 4, 2019. https://support.minitab.com/en-us/minitab/18/help-and-how-to/statistics/basic-statistics/supporting-topics/basics/null-and-alternative-hypotheses/
- Minitab.com. "What Are Type I and Type II Errors?" Accessed February 4, 2019. https://support.minitab.com/en-us/minitab/18/help-and-howto/statistics/basic-statistics/supporting-topics/basics/type-i-and-type-iierror/
- Zaiontz, Charles. "Null and Alternative Hypothesis." Accessed February 2, 2018. http://www.real-statistics.com/hypothesis-testing/null-hypothesis/
- https://www.britannica.com/science/statistics/Hypothesis-testing
- https://www.dummies.com/education/math/business-statistics/drawconclusions-about-a-population-using-confidence-intervals-and-hypothesistesting/
- https://online.stat.psu.edu/statprogram/reviews/statistical-concepts/proportions
- https://people.richland.edu/james/lecture/m170/ch09-int.html
- https://www.khanacademy.org/math/ap-statistics/tests-significance-ap/onesample-z-test-proportion/v/comparing-p-value-to-significance-level-example

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