Week 4

# Confidence Interval and Hypothesis Testing Of Two Sample Means Worksheet MTH 160: Statistics

Averett UNIVERSITY
SINCE 1859
Big Dreams BOLD FUTURES

**Read** the following scenario and complete each of the seven problems below:

A new car manufacturing company has emerged and has claimed that its new hybrid car, the Pusho, gets a better gas mileage than the highest ranked Toyota Prius. Consumer Reports Magazine decides to test this claim at a 5% level of significance. Consumer Reports randomly selects 10 of each type of car, calculates the miles per gallon for each car in the study, and records the data in the table below. Assume miles per gallon of the cars is normally distributed.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pusho | 54.1 | 52.4 | 55.7 | 49.7 | 50.6 | 48.9 | 51.8 | 54.5 | 56.9 | 49.8 |
| Prius | 53.2 | 54.3 | 49.8 | 50.1 | 50.5 | 56.1 | 47.8 | 53.4 | 56.8 | 48.7 |

A. Evaluate the claim that the Pusho gets a better gas mileage than the highest ranked Prius using the data from the Consumer Reports study.
1. Identify the type of test you will use to test this claim. Explain your reasoning.
2. State the null and alternate hypotheses.
3. Conduct the hypothesis test and determine the p-value.
4. State your conclusion about the claim.
5. Construct a 90% confidence interval for this study.

1.

2.

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4.

5.

Suppose that Toyota makes a counter-claim that their Prius has a higher gas mileage than Pusho.
How could the alternative hypotheses from Part A be changed to test Toyota's claim?
Conduct the hypothesis test at the 5% level of significance for Toyota's claim using the data above and determine the p-value.
State your conclusion about the claim.
Construct a 98% confidence interval for this study.

1.

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C. Based on your analysis of both claims from the makers of Pusho and Prius, what statement can be made about the miles per gallon of the two cars? Explain your reasoning.

*<Compose response here>*

Week 4

# Confidence Interval and Hypothesis Testing Of One Sample Mean Worksheet
# MTH 160: Statistics

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**Read** the following scenario and complete each of the problems below:

> A flashlight company claims that the new bulb in its heavy duty flashlight will average 246 hours of light. A statistics student decides that he/she wants to test this claim at a 5% level of significance to determine if there is evidence to support the claim. The student randomly selects and tests 15 flashlight bulbs and records how long the bulb lasts until it burns out. Assume the life of a bulb is normally distributed. The data is in the table below:

| Trial | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hrs: | 246 | 224 | 231 | 242 | 237 | 240 | 243 | 236 | 239 | 255 | 256 | 239 | 247 | 231 | 253 |

A. Based on a histogram or box-plot of the data, what is the shape of the distribution (normal, skewed left, skewed right, uniform, etc.)? Explain why you can conduct a hypothesis test on the given data.

*<Compose answer here>*

B. Evaluate the claim based on the following assumption: The standard deviation of the population is 7.4 hours.
   1. Identify the type of test you will use to test the claim that the flashlight will average 246 hours of light. Explain your reasoning.
   2. State the null and alternate hypotheses.
   3. Conduct the hypothesis test and determine the p-value.
   4. State your conclusion about the claim that the flashlight will average 246 hours of light.
   5. Construct a 95% confidence interval for this study.

1.

2.

3.

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C. Evaluate the claim based on the following assumption: The population's standard deviation is not known.
   1. Identify the type of test you will use to test the claim that the flashlight will average 246 hours of light. Explain your reasoning.
   2. State the null and alternate hypotheses.
   3. Conduct the hypothesis test and determine the p-value.
   4. State your conclusion about the claim that the flashlight will average 246 hours of light.
   5. Construct a 95% confidence interval for this study.

1.

2.

3.

4.

5.

D. Write a 200- to 400- word statement comparing and contrasting the two hypothesis test procedures and results.

*<Compose answer here>*