

## 8.7: Confidence Interval -Women's Heights (Worksheet)

Name: \_\_\_\_\_

Section: \_\_\_\_\_

Student ID#: \_\_\_\_\_

*Work in groups on these problems. You should try to answer the questions without referring to your textbook. If you get stuck, try asking another group for help.*

### Student Learning Outcomes

- The student will calculate a 90% confidence interval using the given data.
- The student will determine the relationship between the confidence level and the percentage of constructed intervals that contain the population mean.

### Given:

*Heights of 100 Women (in Inches)*

59.4	71.6	69.3	65.0	62.9	66.5	61.7	55.2
67.5	67.2	63.8	62.9	63.0	63.9	68.7	65.5
61.9	69.6	58.7	63.4	61.8	60.6	69.8	60.0
64.9	66.1	66.8	60.6	65.6	63.8	61.3	59.2
64.1	59.3	64.9	62.4	63.5	60.9	63.3	66.3
61.5	64.3	62.9	60.6	63.8	58.8	64.9	65.7
62.5	70.9	62.9	63.1	62.2	58.7	64.7	66.0
60.5	64.7	65.4	60.2	65.0	64.1	61.1	65.3
64.6	59.2	61.4	62.0	63.5	61.4	65.5	62.3
65.5	64.7	58.8	66.1	64.9	66.9	57.9	69.8
58.5	63.4	69.2	65.9	62.2	60.0	58.1	62.5
62.4	59.1	66.4	61.2	60.4	58.7	66.7	67.5
63.2	56.6	67.7	62.5				

- [Table](#) lists the heights of 100 women. Use a random number generator to select ten data values randomly.
- Calculate the sample mean and the sample standard deviation. Assume that the population standard deviation is known to be 3.3 inches. With these values, construct a 90% confidence interval for your sample of ten values. Write the confidence interval you obtained in the first space of [Table](#).
- Now write your confidence interval on the board. As others in the class write their confidence intervals on the board, copy them into [Table](#).

**90% Confidence Intervals**

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

## Discussion Questions

1. The actual population mean for the 100 heights given [Table](#) is  $\mu = 63.4$ . Using the class listing of confidence intervals, count how many of them contain the population mean  $\mu$ ; i.e., for how many intervals does the value of  $\mu$  lie between the endpoints of the confidence interval?
2. Divide this number by the total number of confidence intervals generated by the class to determine the percent of confidence intervals that contains the mean  $\mu$ . Write this percent here: \_\_\_\_\_.
3. Is the percent of confidence intervals that contain the population mean  $\mu$  close to 90%?
4. Suppose we had generated 100 confidence intervals. What do you think would happen to the percent of confidence intervals that contained the population mean?
5. When we construct a 90% confidence interval, we say that we are **90% confident that the true population mean lies within the confidence interval**. Using complete sentences, explain what we mean by this phrase.
6. Some students think that a 90% confidence interval contains 90% of the data. Use the list of data given (the heights of women) and count how many of the data values lie within the confidence interval that you generated based on that data. How many of the 100 data values lie within your confidence interval? What percent is this? Is this percent close to 90%?
7. Explain why it does not make sense to count data values that lie in a confidence interval. Think about the random variable that is being used in the problem.
8. Suppose you obtained the heights of ten women and calculated a confidence interval from this information. Without knowing the population mean  $\mu$ , would you have any way of knowing **for certain** if your interval actually contained the value of  $\mu$  ? Explain.

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