MATH 262 - Applied Statistics
Lab 5: Women's Heights*

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

Table 1: Heights of 100 women

1. Table 1 contains the heights of 100 women. At the following website

    https://www.random.org/integers/

   generate 10 random integers in the range from 1 to 100. Use the generated integers to select 10 heights.

2. Calculate the mean of your sample. Assume that the population standard deviation is known to be $\sigma = 3.3$ inches. With these values, construct a 90% confidence interval for your sample. Write the confidence interval you obtained on the board along with the sample mean.

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*This lab is based on a lab from the book *Introductory Statistics*, OpenStax.

3. Repeat steps 1-2 **two** more times. Thus, you should have three sample means and three confidence intervals on the board.

Now answer the following questions:

1. The actual population mean for the 100 heights is $\mu = 63.4$. Count how many of the confidence intervals on the board contain the population mean μ.

2. Is the percent of confidence intervals that contain the population mean μ close to 90%?

3. Suppose that we had generated 100 confidence intervals. What do you think would happen to the percent of confidence intervals that contained the population mean?

4. 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.

5. Some people 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 first confidence interval that you generated. How many of the 100 data values lie within your confidence interval? What percent is this? Is this percent close to 90%?

6. Explain why it does not make sense to count actual data values that lie in a confidence interval. Think about the random variable that is being used in the problem.

7. Suppose you obtained the heights of ten women and calculated a confidence interval from this information. Without knowing the population mean μ, would you have any way of knowing for certain if your interval actually contained the value of μ? Explain.

8. What interval contains approximately 90% of the sample means on the board? Think about how a confidence intervals is constructed; if necessary re-read the relevant lecture slides. **Hint**: It is not a 90% **confidence** interval.

9. What percentage of the sample means on the board lie within the interval that contains approximately 90% of the sample means?