Class Time:
Names:

The Central Limit Theorem: Central Limit Theorem Lab I

Student Learning Outcome:

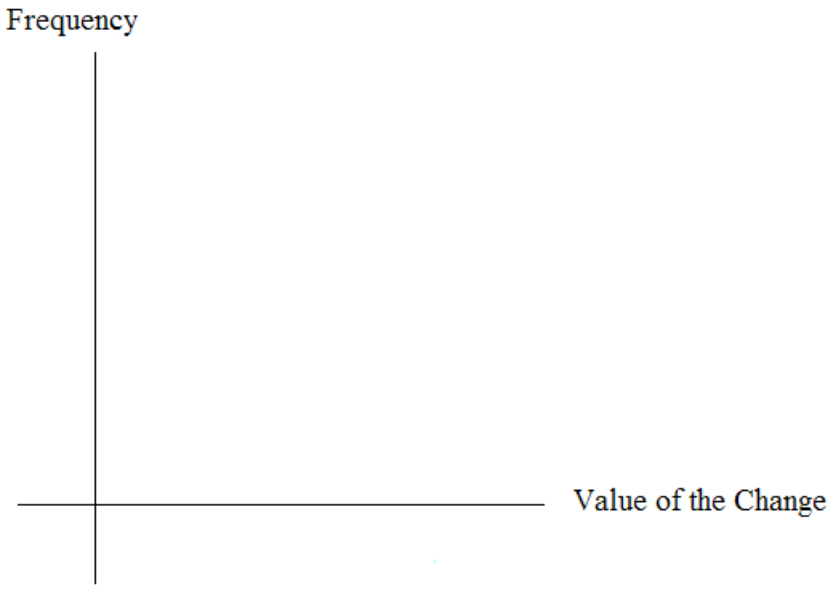
- The student will examine properties of the Central Limit Theorem.

Note: This lab works best when sampling from several classes and combining data.

Collect the Data

1. Count the change in your pocket. (Do not include bills.)
2. Randomly survey 30 classmates. Record the values of the change.

3. Construct a histogram. Make 5 - 6 intervals. Sketch the graph using a ruler and pencil. Scale the axes.



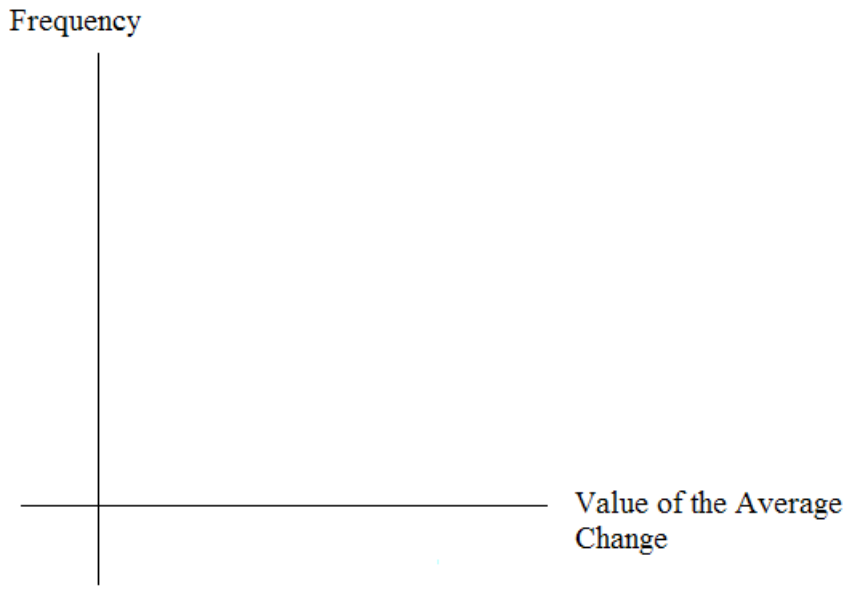
4. Calculate the following: a. $\overline{x}$ = _____ b. s = _____ (n = 1; surveying one person at a time)

5. Draw a smooth curve through the tops of the bars of the histogram. Use 1 – 2 complete sentences to describe the general shape of the curve.

Collecting Averages of Pairs

1. Repeat steps 1 - 5 of "Collect the Data" with one exception. Instead of recording the change of 30 classmates, record the average change of 30 pairs.
2. Randomly survey 30 **pairs** of classmates. Record the values of the average of their change.

3. Construct a histogram. Scale the axes using the same scaling you did previously. Sketch the graph using a ruler and a pencil.



4. Calculate the following: a. $\overline{x}$ = _____ b. s = _____ (n = 2; surveying two people at a time)

5. Draw a smooth curve through the tops of the bars of the histogram. Use 1 – 2 complete sentences to describe the general shape of the curve.

Collecting Averages of Groups of Five

1. Repeat steps 1 – 5 of "Collect the Data" with one exception. Instead of recording the change of 30 classmates, record the average change of 30 groups of 5.
2. Randomly survey 30 **groups of 5** classmates. Record the values of the change.

3. Construct a histogram. Scale the axes using the same scaling you did previously. Sketch the graph using a ruler and a pencil.

4. Calculate the following: a. $\overline{x}$ = _____ b. s = _____ (n = 5 ; surveying 5 people at a time)

5. Draw a smooth curve through the tops of the bars of the histogram. Use 1 – 2 complete sentences to describe the general shape of the curve.

Discussion Questions

1. As n changed, why did the shape of the distribution of the data change? Use 1 – 2 complete sentences to explain what happened.

2. In “Collect the Data”, what was the approximate distribution of the data?

   X ~ _____

3. In “Collecting Averages of Groups of Five”, what was the approximate distribution of the averages?

   $\overline{X}$ ~ _____

4. In 1 – 2 complete sentences, explain any differences in your answers to 2 and 3.