# Practice: Exploring the Central Limit Theorem

In this practice, you explore the Central Limit Theorem using the **Sampling Distribution of Sample Means** teaching module introduced in the previous JMP Demo.

To open this teaching module:

1. Go to the **Help** menu in JMP and select **Sample Data** (towards the bottom of the menu).
2. Under the **Teaching Resources** outline, click the gray triangle to open the **Teaching Scripts** outline.
3. Open the **Interactive Teaching Modules** outline.
4. Click the link **Sampling Distribution of Sample Means**.

This teaching module enables you to sample data from a population with a specified mean and standard deviation. The default values are for **IQ**, the Intelligence Quotient. The population mean is 100, and the population standard deviation is 15.

The top graph displays the distribution of the population data, the middle graph shows the distribution of the current sample, and the bottom graph shows the distribution of sample means.

1. Click **Draw Addition Samples** under **Run Simulation** to draw one sample at the default settings. This randomly draws one sample, of size 25 from the population. Repeat this 20 (or more) times. What do you notice about the distribution of sample means?

   The distribution of sample means is narrower than the distribution of the population, and it is centered at the population mean.

2. From the table next to the **Distribution of Sample Means** graph, write down the values for **Mean of Sample Means** and **Std Dev of Sample Means**. Is the mean of sample means close to the population mean?

   The mean of sample means is close to the population mean.

3. How does the standard deviation of sample means compare to the population standard deviation?

   The standard deviation of sample means is smaller than the population standard deviation.

4. Change **Sample Size**, n, from 25 to 100. Again, draw 20 (or more) samples. What do you notice about this distribution of sample means where n = 100 in comparison to the distribution of sample means where n = 25?

   This distribution of sample means for n = 100 is narrower than the distribution of sample means for n = 25.

5. Is the mean of sample means for n = 100 close to the population mean? Compare this standard deviation of sample means where n = 100 to the standard deviation of sample means where n = 25. What do you observe?

   The mean of sample means is close to the population mean. The standard deviation of sample means for n = 100 is smaller than the standard deviation of sample means for n = 25.

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