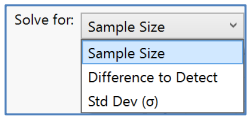
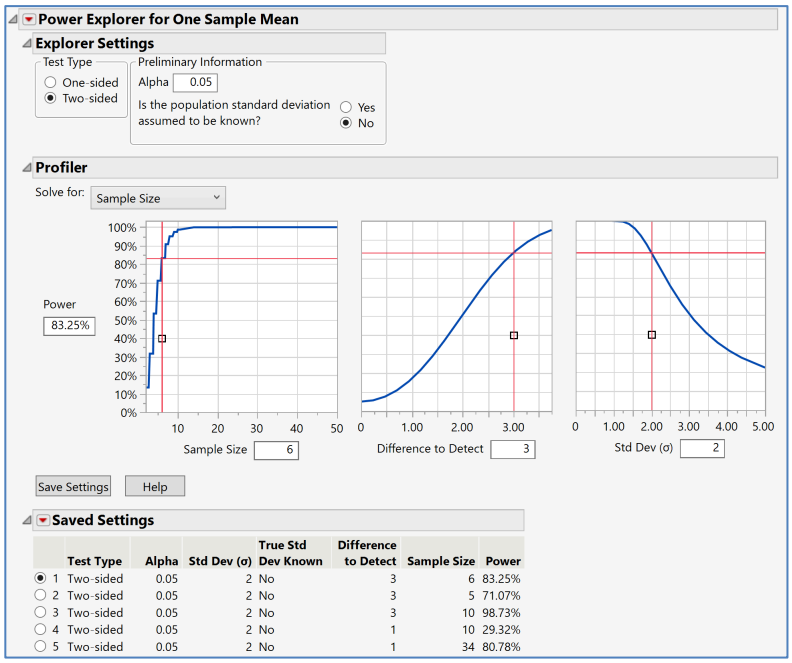
Sample Size and Power for One Sample Mean

Use to interactively explore the relationships between Power, Sample Size, and Difference to Detect in testing a hypothesis for a single population mean. See the **One Sample t-test and Confidence Interval** guide to learn how to perform a statistical test for a population mean.

Sample Size and Power - One Sample Mean

1. Select **DOE > Sample Size Explorers** and choose **Power > Power for One Sample Mean**.
2. Choose the type of test: **One-Sided** or **Two-Sided** and **Alpha** (significance level for the test).
   Here we consider the two-sided alternative hypothesis H_0: $\mu = \mu_0$ vs. H_A: $\mu \neq \mu_0$
3. Choose if standard deviation is known.
   If "Yes" analysis will be based on the Z-Test. If "No" analysis will be based on the t-Test.
4. Enter a value for the **Standard Deviation**. Here we assume 2.0.
5. Enter the **Difference to Detect.** This is the difference between a population mean under H_A considered to be true from the value of the population mean under H_0. Here we consider a difference of 3.0, which is 3.0/2.0 = 1.5 standard deviations from the value of the population mean under H_0.
6. Select parameter to solve for. Here we chose **Sample Size**.
7. Enter a value for the **Power**. Here we entered 0.80.
   The solution (n=6) is shown in the **Sample Size** field.
   Note: The **Power** field changed to 83.25% since sample size can only be an integer.
   n=5 results in a Power of 71.1%.
8. Use the interactive cross-hair tool (or type in values) for **Power**, **Sample Size**, **Difference to Detect**, and **Std Dev** to study the relationship between these parameters solving for many different scenarios.





The settings and solution for each analysis performed can be saved. The table of saved settings shows the results of five different analyses performed when testing the hypothesis H_0: $\mu = \mu_0$ vs. H_A: $\mu \neq \mu_0$

1. What sample size is needed to achieve a power of 80% at detecting a difference of 3/2 = 1.5 std dev? *Answer: n = 6*
2. What is the power with a sample size of 5 for the above scenario? *Answer: Power = 71.1%*
3. What is the power for a sample size of 10 in the above scenario? *Answer: Power = 98.7%*
4. What is the power for a sample size of 10 at detecting a difference of 1/2 = 0.5 std dev? *Answer: Power = 29.3%*
5. What sample size is needed to achieve a power of 80% at detecting a .5 std dev difference? *Answer: n = 34*

Note: Determining sample size to achieve a desired margin of error in a Confidence Interval can be done using **DOE > Sample Size Explorers > Confidence Intervals > Margin of Error for One Sample Mean**.

Visit **Design of Experiments Guide > Sample Size Explorers** in **JMP Help** to learn more.