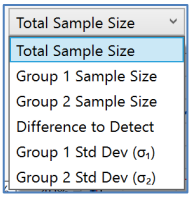
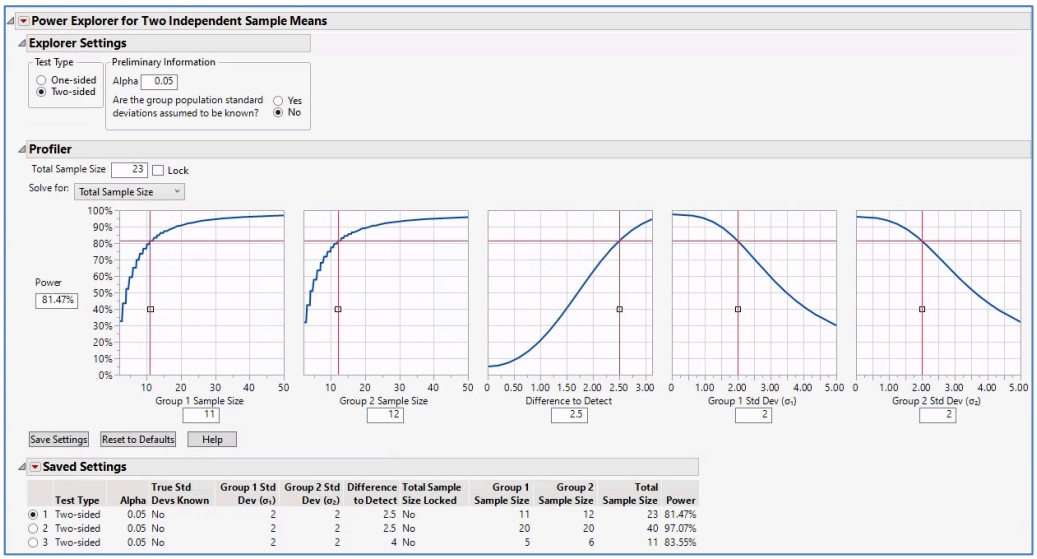
Sample Size and Power for Two Sample Means

Use to interactively explore the relationships between Power, Sample Sizes, and Differences to Detect for testing a hypothesis comparing two population means. See the **Two Sample t-test and Confidence Interval** guide to learn how to perform a statistical test comparing two sample means.

Sample Size and Power - Two Sample Means

1. Select **DOE > Sample Size Explorers** and choose **Power > Power for Two Independent Sample Means**.
2. Choose the type of test: **One-Sided** or **Two-Sided** and choose **Alpha** (significance level for the test).
   The null hypothesis is that the two means are equal. Here we chose a two-sided alternative which is used to test that the two means are not equal.
   This null and alternative hypothesis can be written using notation as H_0: $\mu_1 = \mu_2$ vs. H_A: $\mu_1 \neq \mu_2$
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 **Assumed Standard Deviations**. Here we assume 2 for each.
5. Enter the **Difference to Detect**. This is the difference between the two population means under H_A considered to be true in order to perform the analysis. Here we consider a difference of 2.5, which is 2.5/2.0 = 1.25 standard deviations apart.
6. Select parameter to solve for. Here we chose **Total Sample Size**.
7. Enter a value for the **Power**. Here we entered 0.80.
   The solution of Total Sample Size of 23 (n_1=11 and n_2=12) is displayed.
8. Use the interactive cross-hair tool (or type in values) for **Power**, **Sample Sizes**, **Difference to Detect**, and **Std Devs** to study the relationship between these parameters solving for many different scenarios.





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 Two Independent Sample Means**.

The settings and solution for each analysis performed can be saved. The table of saved settings shows the results of three different analyses performed when testing the hypothesis H_0: $\mu_1 = \mu_2$ vs. H_A: $\mu_1 \neq \mu_2$

1. What sample size is needed to achieve a power of 80% at detecting a difference of 2.5/2 = 1.25 std dev?
   Answer: 23 (n_1 = 11 and n_2 = 12)
2. What is the power with a sample size of 20 in each group? *Answer: Power = 97.1%*
3. What sample size is needed to achieve a power of 80% at detecting a difference of 4/2 = 2 std dev?
   Answer: 11 (n_1 = 5 and n_2 = 6)

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