Weighted Data and Significance Testing Tools

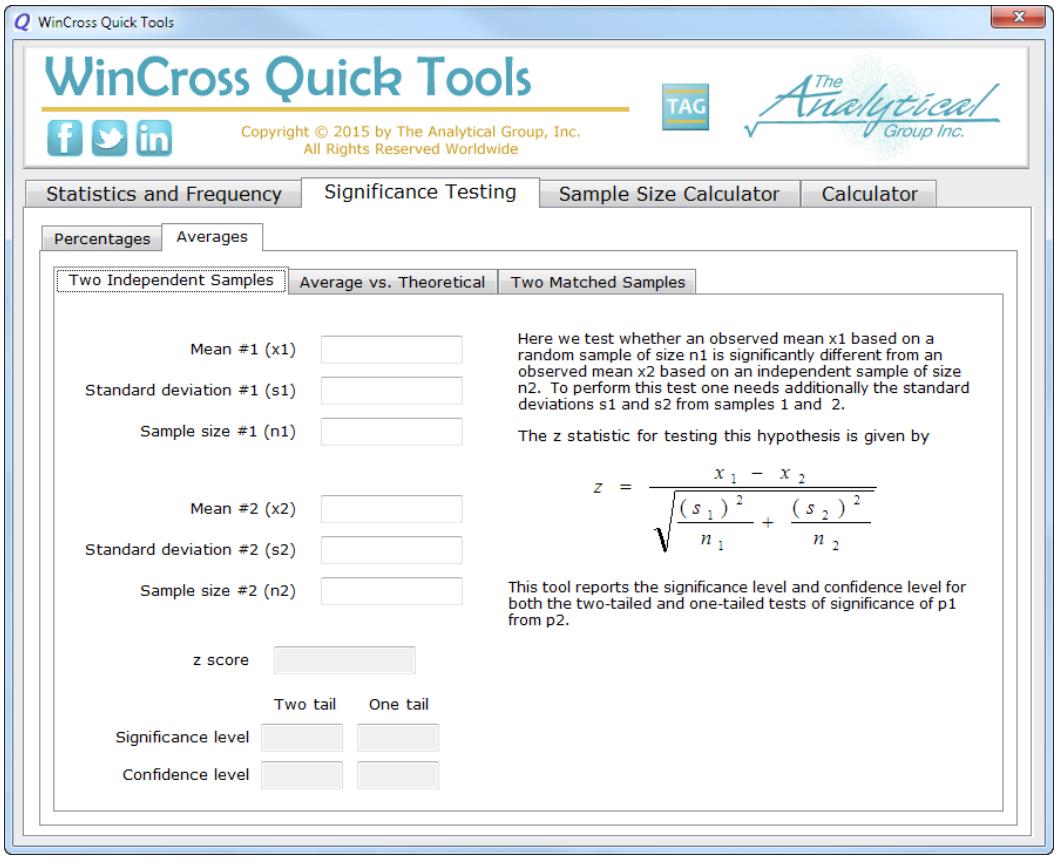
When dealing with other than unweighted data based on independent simple random samples WinCross uses sophisticated methodology when testing significance of mean or percentages (proportions). Details can be found in the Statistical Reference Guide available from the WinCross **Help** menu . Statistical testing becomes much more complicated when dealing with weighted data.

The **Significance Testing** tool shown below, will be accessible from the **Tools** menu in WinCross V16 and only applies to significance testing for *unweighted* statistics based on independent simple random samples. The tool can also be downloaded by going to www.AnalyticalGroup.com/support_free_tools.htm. Our significance testing tool, as well as others like it available on the web, should only be used for statistical tests based on *unweighted* data from independent samples.

Some users might want to use this tool for statistical testing with weighted data. There are two approaches to the treatment of weighted data in statistical tests, the one employed by WinCross and the one employed by some other statistical programs, notably SPSS. The WinCross approach is the more accurate approach; documentation of this claim can be found on The Analytical Group website www.analyticalgroup.com/support_wc_faqs.htm under the **HELPFUL DOCUMENTS** heading.

The following describes ways to use this tool with weighted data.

Averages:

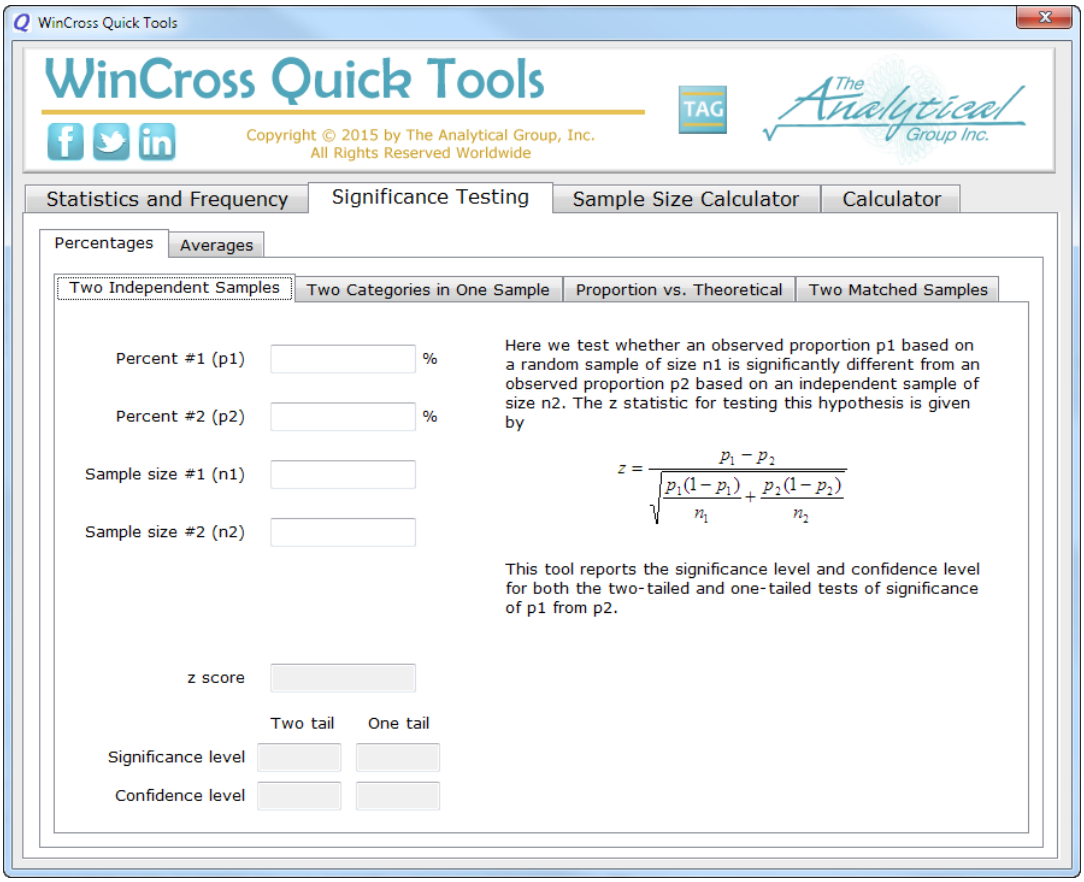


WinCross approach: For each of the samples, fill in the mean box with the weighted mean, fill in the standard deviation box with the unweighted standard deviation, and fill in the sample size box with the effective sample size, calculated as

$$f = \frac{(\sum_{i=1}^{n} w_i)^2}{\sum_{i=1}^{n} w_i^2}$$

SPSS approach: For each of the samples, fill in the mean box with the weighted mean, fill in the standard deviation box with the weighted standard deviation, and fill in the sample size box with the sum of the weights.

Percentages:



WinCross approach: This **Quick Tool** *cannot* replicate the WinCross computation. That computation requires use of both the weighted percent (the quantity required for the percent box), the effective sample size, calculated as

$$f = \frac{(\sum_{i=1}^{n} w_i)^2}{\sum_{i=1}^{n} w_i^2}$$

for the sample size box, and an additional quantity, namely the UNWEIGHTED PERCENTAGE (which is used in the variance computation for weighted significance testing). Since this spreadsheet does not make provisions for introduction of the unweighted percentage, use of the weighted percentage throughout the internal computations of this spread sheet will *not* reproduce the (correct) WinCross computation.

SPSS approach: For each of the samples, fill in the percent box with the weighted percent and fill in the sample size box with the sum of the weights.