



Minitab[®] 16

Statistical Software

Upgrade now to access more than 70 new features and enhancements including greater statistical power, a new Assistant that guides you step-by-step through your analysis, and more.

Learn What's New ►

Minitab® 16 delivers more.

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 - All Languages in One
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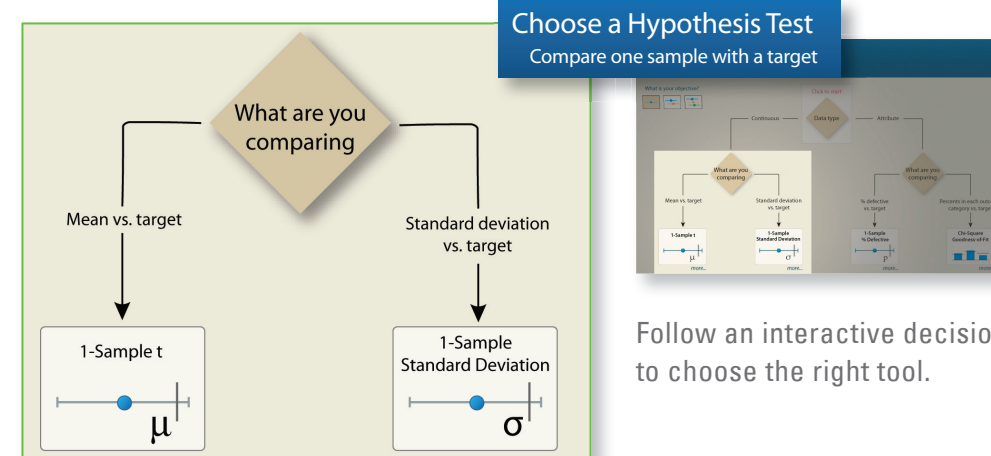
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Top Enhancements in Minitab® 16

1. The Assistant.

Let Minitab's new Assistant menu lead you through your analysis and help you interpret your results with confidence.



Follow an interactive decision tree to choose the right tool.

1-Sample t

Home > Continuous data > Compare mean to target

Click to perform test

Guidelines

- Collect a random sample of data. +
- Collect enough data. +
- Enter the data in the order that you collect it. +
- The process should be stable when you collect the data. +
- The data do not need to be normally distributed. +
- Examine unusual data points. +

Review guidelines to ensure your analysis is successful.

1-Sample t Test

Counts
Failures
Sample data
Data column: Weight

Test setup

What target do you want to test the mean against?
Target: 920

What do you want to determine?

- Is the mean of Weight greater than 920?
- Is the mean of Weight less than 920?
- Is the mean of Weight different from 920?

Run your analysis using a simplified interface that is easy to understand.

Use the comprehensive reports and provided interpretation to present your results.

1-Sample t Test for the Mean of Weight
Summary Report

Does the mean differ from 920? > 0.5

Yes No

P = 0.017
The mean of Weight is significantly different from the target (p < 0.05).

Statistics	
Sample size	45
Mean	936.89
95% CI	(923.13, 950.65)
Standard deviation	43.805
Target	920

2. Enhanced Regression Capabilities.

Use the new General Regression feature to to:

- ▶ Easily specify interaction and polynomial terms
- ▶ Include both continuous and categorical predictors
- ▶ Calculate confidence intervals for regression coefficients
- ▶ Transform the response using the Box-Cox transformation

General Regression Analysis: Weight versus Height, Diameter, Site

Regression Equation

Site

1 Weight = 0.263341 + 0.567829 Height - 1.47128 Diameter + 0.188015 Diameter*Diameter

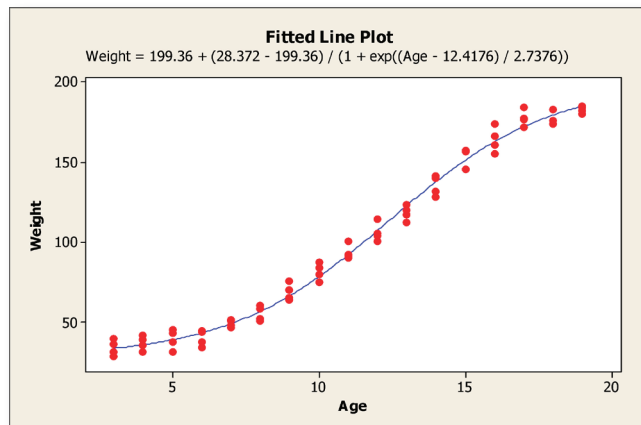
2 Weight = 0.353579 + 0.567829 Height - 1.47128 Diameter + 0.188015 Diameter*Diameter

Coefficients

Term	Coef	SE Coef	T	P	95% CI
Constant	0.30846	0.129539	2.3812	0.018	(0.05350, 0.56342)
Height	0.56783	0.026660	21.2986	0.000	(0.51536, 0.62030)
Diameter	-1.47128	0.071075	-20.7004	0.000	(-1.61116, -1.33139)
Diameter*Diameter	0.18801	0.006398	29.3864	0.000	(0.17542, 0.20061)
Site					

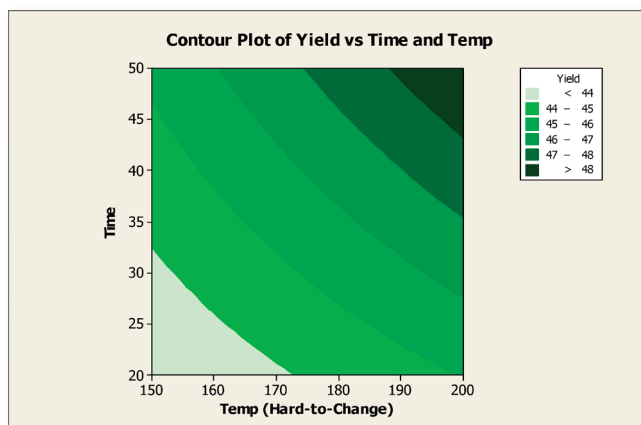
3. Nonlinear Regression.

Model nonlinear relationships between variables using a catalog of expectation functions, or specify your own function.



4. Split-Plot Designs.

Create, define, and analyze split-plot designs when conducting experiments that include hard-to-change factors.



5. General Linear Model (GLM) Prediction and Comparisons.

Compute predicted values and confidence intervals for new observations. Use the new grouping information table to easily compare the mean responses for individual factor levels.

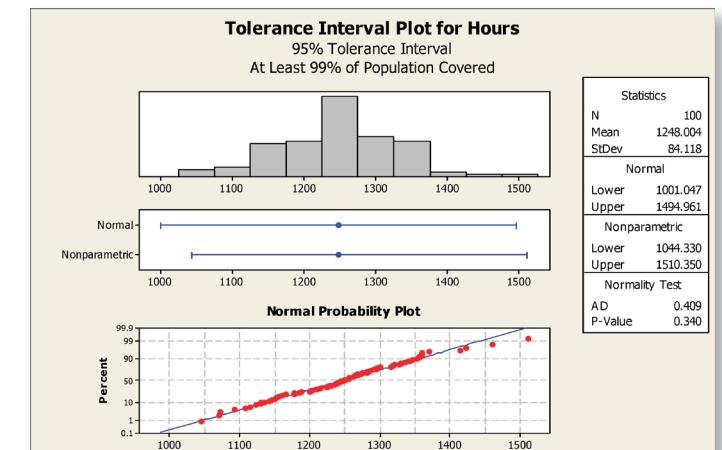
Grouping Information Using Tukey Method and 95.0% Confidence

Plant	N	Mean	Grouping
2	48	477.3	A
4	48	475.8	A B
1	48	474.5	B
3	48	472.0	C

Means that do not share a letter are significantly different.

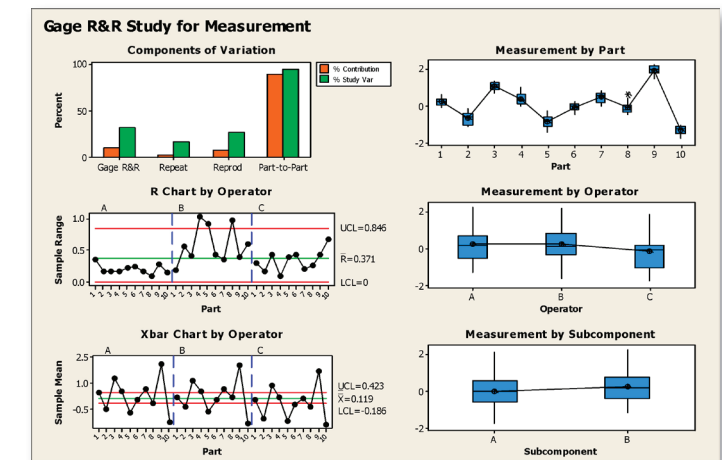
6. Tolerance Intervals.

Calculate bounds for a given proportion of a population.



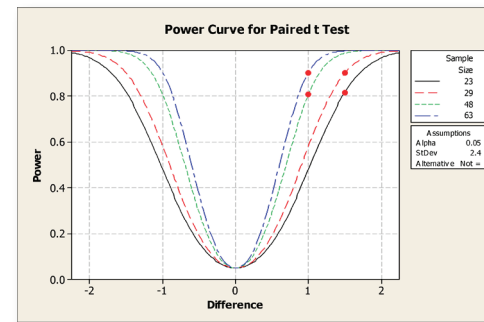
7. Gage R&R Expanded.

Analyze studies that have missing data, include more than 2 factors, are crossed or nested, and have factors that are fixed or random.



8. Additional Power and Sample Size Tools.

Access an expanded suite that includes sample size for estimation, paired t, 1- and 2-sample Poisson rates, 1 and 2 variances, and general full factorial designs.

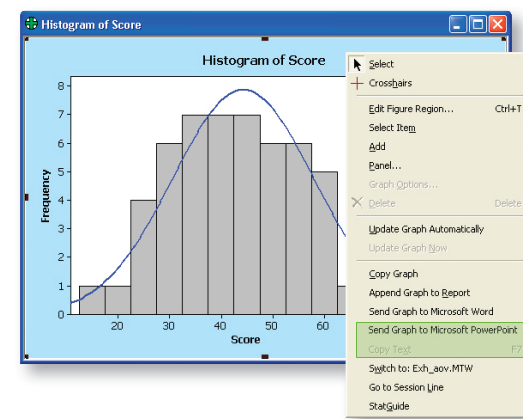


9. Faster Performance.

Import large datasets and open project files even faster with Minitab 16.

10. Export to PowerPoint and Word.

Export your results directly to Microsoft PowerPoint or Word for easy reporting.

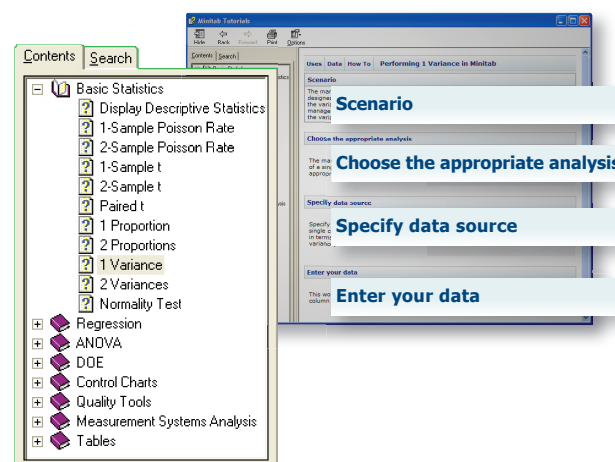


11. All Languages in One.

Choose from seven translated versions, including English, French, German, Japanese, Korean, Simplified Chinese, and Spanish, all in one package.

12. New Tutorials.

Forty-five new tutorials provide step-by-step instructions on how to use many popular tools.



The Assistant

Use this new menu to analyze your data with confidence. The Assistant contains an interactive decision tree that helps you choose the right tool and walks you through your analysis step-by-step. It includes guidelines to ensure your analysis is successful, has a simplified interface that is easy to understand, and even provides comprehensive reports and interpretation of your output that you can use to present your results.

Basic Statistics

New Display Descriptive Statistics Options. You can now easily choose to display your preferred default statistics, all statistics or clear the selected statistics.

1 Variance. The 1 Variance test has been improved, providing the ability to perform a hypothesis test for the variance or standard deviation. For improved accuracy, the Bonett method replaces the Adjusted method used in previous releases.

2 Variances. Perform a hypothesis test for the variances or standard deviations. Using Options, you can specify a 1- or 2-sided alternative hypothesis and a hypothesized ratio. There is also a new Graphs button you can use to visually compare samples with a single click.

Regression

General Regression. Use this new feature to:

- ▶ Easily specify interaction and polynomial terms
- ▶ Include both continuous and categorical predictors
- ▶ Calculate confidence intervals for regression coefficients
- ▶ Transform the response using the Box-Cox transformation

Nonlinear Regression. Model nonlinear relationships between variables using a catalog of expectation functions, or specify your own function.

Orthogonal Regression. Perform orthogonal (Deming) regression for a predictor variable that contains error by specifying the error variance ratio.

Binary Logistic Regression – Event Probabilities. Compute event probabilities and corresponding confidence intervals for new observations. Store event probabilities in the worksheet for all rows or only unique rows.

Ordinal and Nominal Logistic Regression – Event Probabilities. Store event probabilities in the worksheet for all rows of data.

Partial Least Squares Enhancements. This improved feature now provides the ability to specify interaction and polynomial terms and include categorical predictors. You can also specify coding and reference level options.

Complete List of What's New

ANOVA

One-Way ANOVA – Comparisons. Easily compare the mean responses for individual factor levels using a new grouping information table.

General Linear Model Improvements. Compute predicted values and confidence intervals for new observations. You can also use the new grouping information table to easily evaluate multiple comparisons and compare the mean responses for significant factors.

DOE

Split-Plot Designs. Create, define, and analyze split-plot designs when conducting experiments that include hard-to-change factors.

Sum of Squares for Individual Terms. The ANOVA tables have been enhanced to include sum of squares for individual terms for factorial, response surface, and mixture designs and for analyzing variability.

Modify Design Improvements. Easily randomize factorial, response surface and mixture designs and sort by run order in one step.

Gage R&R

Gage R&R Crossed and Nested Improvements. Compute confidence intervals for Gage R&R results. Easily identify and compare parts on Xbar, R, and S charts using new labels and tooltip information.

Gage R&R Expanded. Use this new feature to analyze studies that:

- ▶ Are balanced or unbalanced (i.e. have missing data)
- ▶ Include more than 2 factors
- ▶ Are crossed or nested
- ▶ Have factors that are fixed or random

Gage Run Charts for Missing Data. Create these useful charts for studies that are balanced or unbalanced (i.e. have missing data).

Attribute Agreement Analysis

Create Attribute Agreement Analysis Worksheet. Create data collection worksheets prior to conducting an attribute agreement analysis.

Disagreement Summary Table. Display a disagreement summary table to evaluate how often each appraiser disagrees with the known standard.

Complete List of What's New

Capability Analysis

Normal Capability Transformations. Normal capability analysis includes a new Transform button, providing easier accessibility to both the Box-Cox and Johnson transformations.

Johnson Transformation Improvement. This transformation now computes capability indices even when the specification limits fall outside the range of the transformation.

Improved Capability Sixpack. Choose to display the benchmark Z (sigma level) values. Output also now includes PPM.

Other Quality Tools

Improved Pareto Chart Interface. The new interface has been simplified for added flexibility and ease of use.

Tolerance Intervals. Calculate bounds for a given proportion of a population.

Multivariate

Principal Components Analysis – Outlier Plot. Display the Mahalanobis distances and detect outliers using the new Outlier Plot.**Principal Components Analysis – Mahalanobis Distances.** Store the Mahalanobis distance values in the worksheet.

Tables

Store Tally Results. Store the results from Tally Individual Variables in the worksheet.

Power and Sample Size

Seven New Features. The power and sample size suite has been expanded to include:

- ▶ Sample size for estimation
- ▶ Paired t
- ▶ 1- and 2-sample Poisson rates
- ▶ 1 and 2 variances
- ▶ General full factorial designs

Improved Features. The power and sample size interfaces for 1 and 2 proportions and Plackett-Burman designs have been revised for improved ease of use.

Line Plot

Display Y as a Percent. The line plot includes a new option to display the Y variable as a percent.

Help

New Tutorials. Forty-five new tutorials provide step-by-step instructions on how to use many popular tools.

Meet Minitab Added to Help. The Meet Minitab guide for getting started is now conveniently located in the Help menu.

More Sample Datasets. Several new datasets have been added, including those referenced in StatGuide, providing you with all the data needed to work through the Help examples.

Input/Output

Faster Performance for Datasets and Project Files. Import your datasets and open project files even faster.

Export Results to PowerPoint or Word. Export your results directly to Microsoft PowerPoint or Word for easy reporting.

Deleting Values. You can now use the Delete key to delete only the data from a cell, column or row without removing the entire field from the worksheet.

Tools

More Options. Expanded Options include the ability to select your language version of Minitab and define report settings for the Assistant.

DMAIC Toolbar. The popular toolbar that organizes statistical tools according to the DMAIC roadmap is now accessible via Manage Profiles.

Installation

Access to All Languages. You can now choose from seven translated versions all in one package, including English, French, German, Japanese, Korean, Simplified Chinese, and Spanish.

Customized Installation. Use the new installation customization tool to create configuration files with customized settings.

▶ = New or enhanced in Release 16

Assistant

- ▶ Menu that easily leads you through your analysis
- ▶ Includes an interactive decision tree to help you choose the right tool
- ▶ Provides guidelines to ensure your analysis is successful
- ▶ Uses a simplified interface that is easy to understand
- ▶ Provides interpretation of your output
- ▶ Creates comprehensive reports for presenting results

Basic Statistics

- ▶ Descriptive statistics
 - One-sample Z test
 - One- and two-sample t-tests, paired t-test
 - One and two proportions tests
 - One- and two-sample Poisson rate tests
- ▶ One and two variances tests
 - Correlation and covariance
 - Normality test
 - Goodness-of-fit test for Poisson

Graphics

- Pictorial galleries simplify graph creation
- Interactively edit attributes: axes, labels, etc.
- Information display tools: tooltips, crosshairs, etc.
- Recreate custom graphs with new data
- Easily place multiple graphs on one page
- Graphs can update as data change
- Scatterplots, matrix plots, boxplots, dotplots, histograms, charts, time series plots, etc.
- ▶ Line plots
- Contour and rotating 3D plots
- Probability and probability distribution plots
- QLE to edit Minitab graphs in other applications
- Graph brushing to explore points of interest
- Export: TIF, JPEG, PNG, BMP, GIF, EMF

Regression Analysis

- ▶ Linear regression
- ▶ Nonlinear regression
- ▶ Orthogonal regression

- ▶ Binary, ordinal and nominal logistic regression
- ▶ Partial least squares
 - Stepwise and best subsets
 - Residual plots
- ▶ Confidence and prediction intervals

Analysis of Variance

- ▶ ANOVA
- ▶ General Linear Model
 - Unbalanced nested designs
 - MANOVA
 - Fully nested designs
- ▶ Multiple comparisons
 - Analysis of means
 - Residual, main effects, and interaction plots

Statistical Process Control

- Run chart
- ▶ Pareto chart
- Cause-and-effect diagram
- Variables control charts: XBar, R, S, XBar-R, XBar-S, I, MR, I-MR, I-MR-R/S, zone, Z-MR
- Attributes control charts: P, NP, C, U
- Time-weighted control charts: MA, EWMA, CUSUM
- Multivariate control charts: T², generalized variance, MEWMA
- Historical/shift-in-process charts
- Individual distribution identification
- Box-Cox transformation
- ▶ Johnson transformation
- ▶ Process capability: normal, non-normal, attribute, batch
- ▶ Process capability for multiple variables
- ▶ Process Capability Sixpack™
- Multi-Vari chart
- Symmetry plot
- Acceptance sampling and OC curves
- ▶ Tolerance intervals

Measurement Systems Analysis

- ▶ Data collection worksheet generator
- ▶ Gage R&R Crossed: ANOVA and XBar-R methods
- ▶ Gage R&R Nested
- ▶ Gage R&R for more than two variables
- Misclassification probabilities

- ▶ Gage run chart
 - Gage linearity and bias
 - Type 1 Gage Study (single part)
 - Attribute Gage Study – AIAG analytic method
- ▶ Attribute agreement analysis

Design of Experiments

- ▶ Two-level factorial designs
- ▶ Split-plot designs
- ▶ General factorial designs
- ▶ Plackett-Burman designs
- ▶ Response surface designs
- ▶ Mixture designs
 - D-optimal and distance-based designs
 - Taguchi designs
 - User-specified designs
- ▶ Analyze variability for factorial designs
 - Botched runs
 - Response prediction
 - Response optimization
 - Plots: residual, main effects, interaction, cube, contour, surface, wireframe
 - Effects plots: normal, half-normal, Pareto

Reliability/Survival Analysis

- Parametric and nonparametric distribution analysis
- Goodness-of-fit measures
- ML and least squares estimates
- Exact failure, right-, left-, and interval-censored data
- Accelerated life testing
- Regression with life data
- Reliability test plans
- Threshold parameter distributions
- Analysis of repairable systems
- Analysis of multiple failure modes
- Probit analysis
- Weibayes analysis
- Hypothesis tests on distribution parameters
- Plots: distribution, probability, hazard, survival
- Warranty analysis

Power and Sample Size

- ▶ Sample size for estimation
 - One-sample Z
 - One- and two-sample t
- ▶ Paired t
- ▶ One and two proportions
- ▶ One- and two-sample Poisson

- rates
 - ▶ One and two variances
 - One-Way ANOVA
 - Two-level factorial design
 - ▶ Plackett-Burman and general full factorial designs
 - Power curves

Multivariate Analysis

- ▶ Principal components analysis
 - Factor analysis
 - Discriminant analysis
 - Cluster analysis
 - Correspondence analysis
 - Item analysis (Cronbach's alpha)

Time Series and Forecasting

- Time series plots
- Trend analysis
- Decomposition
- Moving average
- Exponential smoothing
- Winters' method
- Auto-, partial auto-, and cross correlation functions
- ARIMA

Nonparametrics

- Sign test
- Wilcoxon test
- Mann-Whitney test
- Kruskal-Wallis test
- Mood's median test
- Friedman test
- Runs test

Tables

- Chi-square, Fisher's exact, and other tests
- Chi-square goodness-of-fit test
- ▶ Tally individual variables

Simulation and Distributions

- Random number generator
- Density, cumulative distribution, and inverse cumulative distribution functions
- Random sampling

Macros and Customizability

- Customizable menus and toolbars
- ▶ Extensive preferences and user profiles
- ▶ DMAIC toolbar
- Powerful macro capability
- COM-enabled automation



Learn more and find a local Minitab representative at
www.minitab.com.