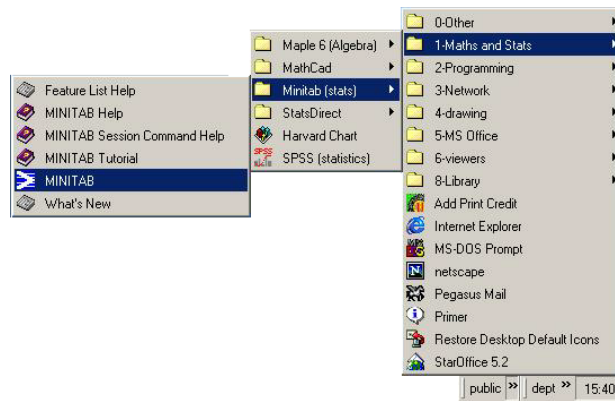


Minitab

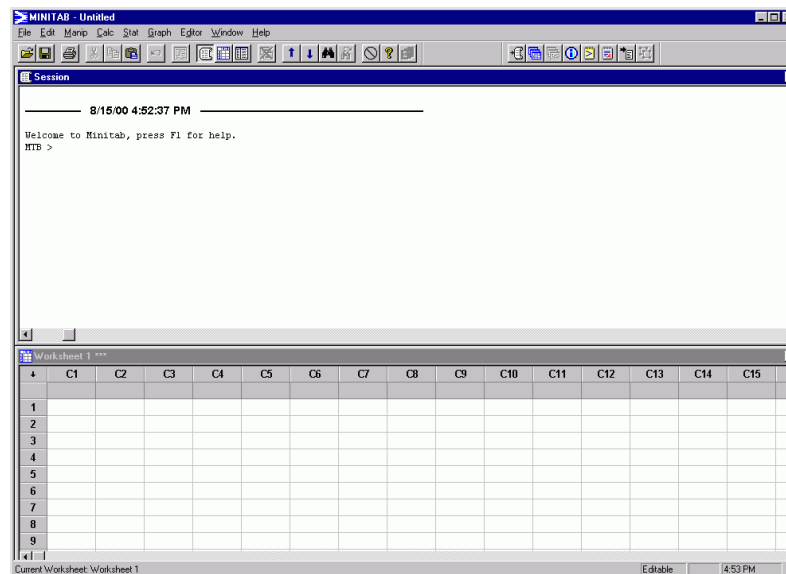
Introduction Minitab is a general-purpose data analysis system for organising, analysing and reporting of statistical data. Data is organised into worksheets consisting of rows and columns of data rather like a conventional spreadsheet. There are facilities for retrieving, editing and saving worksheets as well as commands for performing actions on selected data. Graphical output of results to both screen and printer is available.

The Minitab interface consists of windows, menus and dialogue boxes but a command language is also available for flexibility and speed. There are several different windows, for example, a Data window in worksheet format; a Session window that displays results and Graph windows for high-resolution graphs.

Starting Minitab To start Minitab, choose the Minitab option from the Public>Maths. and Stats>Minitab (stats) menus:



On start up, two windows are visible, with Title, Menu and Toolbars above them:



The Title bar contains the minimise, maximise and close buttons on the right hand side. The Menu bar consists of the usual Windows menus, plus some specific to Minitab, such as

Calc and Stat. Details of the menus are given in the Appendix to this chapter.

The Toolbar provides quick access to some of the more commonly used menu options. Pointing to a button on the Toolbar will display its function.

The Session Window

The Session window in the top half of the screen will display the commands you enter and the output generated. It contains the prompt `MTB>` at which you can type Minitab commands if you are familiar with them. Alternatively, you can choose commands from the Menus and they will automatically appear at the prompt as if you had typed them. You can intersperse menu commands and typed commands, or just use one or the other, as you prefer.

The Session window can also be used to generate reports and to add comments to the output. You can cut, copy, and paste, change fonts, find and replace numbers and text and print the window.

The Data Window

The Data window displays the current worksheet in a spreadsheet format, with rows and columns that intersect to form individual cells. The size of the worksheet should be 100,000 cells. If your computer is low on memory it may be smaller than this. You can have only one Data Window and worksheet open at a time.

In the Data window you can enter columns of data into the worksheet, name, resize, and format columns and cut, copy, or paste the content cells to and from the Clipboard.

Although the Data window has rows and columns, it is not a spreadsheet like Microsoft Excel. Cells contain values that you type or generate with commands; they cannot contain formulas that update values from data based in other cells.

Entering Commands

You can issue commands in Minitab in two ways either by choosing them from the menu bar, or, if you are already familiar with the commands, by typing them at the `MTB>` prompt in the Session window.

When you choose items from a menu which are followed by an ellipsis (...), dialogue boxes appear. When you select items followed by the symbol >, submenus with more commands appear.

If a menu command is dimmed, the item is currently unavailable. Sometimes whole menus are dimmed, indicating that all the commands in the menu are unavailable.

If a command requires information from you, Minitab will open a dialogue box; if not, Minitab executes the command immediately.

To leave a menu selection at any time, move the mouse pointer off the menu and release the button.

Dialogue Boxes

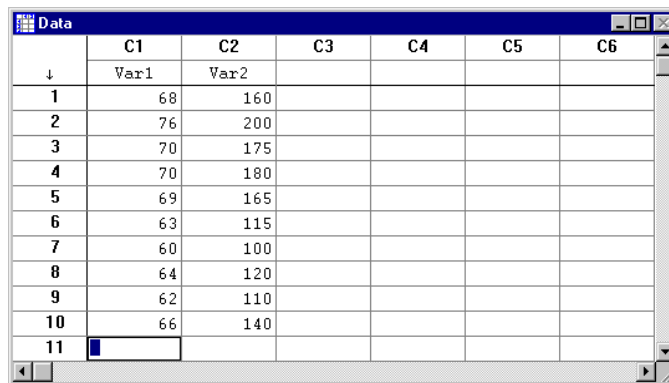
Choosing a command from a menu usually opens a dialogue box allowing you to choose variables and options. If you have questions about any of the options, click the Help button in the bottom left corner of the dialogue box.

Entering Data To enter data into the worksheet:

- ⇒ Position the mouse cursor in the first cell by pointing and clicking in it.
- ⇒ Type the data into the cell.
- ⇒ Press RETURN to move down the column to the next cell or the tab key to move along the row to the next cell on the right.

The columns in the Data window are numbered C1, C2 etc. but you can also give each column a meaningful name by typing into the blank cell below the column number.

For example, typing in two columns of data and naming them Var1 and Var2, would result in the Data window looking like this:



	C1	C2	C3	C4	C5	C6
↓	Var1	Var2				
1	68	160				
2	76	200				
3	70	175				
4	70	180				
5	69	165				
6	63	115				
7	60	100				
8	64	120				
9	62	110				
10	66	140				
11						

Data From Files

If your data are stored in a file, you can open the file directly into the worksheet. To replace the contents of the current worksheet with data from a file, choose Open Worksheet from the File menu. From the resulting dialogue box, select the type of file you want to open and choose it from the list or type in the file's name directly.

You can open many types of files, including plain text, Excel, and dBASE files. To see how the data will look when in the worksheet, click on the Preview button before opening it. Preview will also allow you to change column names or numbers and choose which columns to import.

The Options button in the Open file dialogue box allows you to give special instructions to Minitab on how the data is organised in the file, such as how the columns are delimited (space, tabs etc.).

Printing Worksheets

To print your worksheet, make the Data window active (click in the window, or press CTRL-D), then choose Print Window from the File menu.

Saving Worksheets

To save the data in a worksheet, use Save Current Worksheet from the File menu. If you want to rename a worksheet or save it to a new location use Save Current Worksheet As. (Note that this will not save any graphs or output from the Session window - just the data).

When the dialogue box appears, make sure the correct file type appears in the 'Save as type:' box. Then enter the file name of your choice in the File Name box. Select the correct drive and directory as necessary to tell Minitab where to save the file.

Most of the time you will probably want to save your worksheet as a Minitab worksheet (.mtw) file, since this is the fastest, most efficient way to save all the worksheet information, including columns, stored constants, matrices, variable names, and Data window settings.

Save your worksheet as a Minitab portable worksheet (.mtp file) when you want to export the data to Minitab running on a different type of computer, such as a mainframe or a Macintosh.

In addition to the standard format, you can save your worksheet data in several other file formats. Some others include:

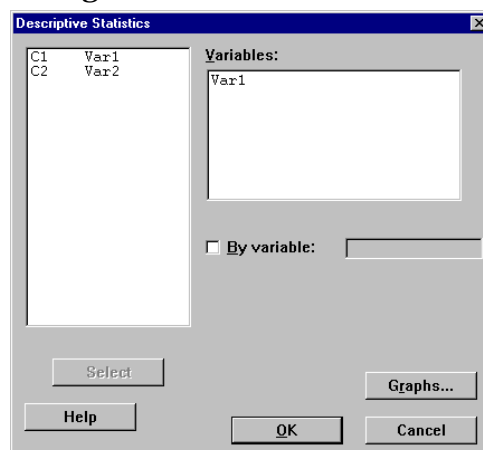
Lotus Symphony (WR?)
Minitab portable worksheet (MTP)
dBASE (DBF)
Excel (XLS)
Quattro Pro (WB1,WQ1)
Text file (TXT, DAT)
Lotus 1-2-3 (WK?)

If you save your worksheet in a non-Minitab format, such as an Excel, Lotus, or text file, Minitab will save columns and (optionally) column names. It will not save stored constants or matrices. If you want to save that data as well, you must copy it to columns first.

Analysing Data

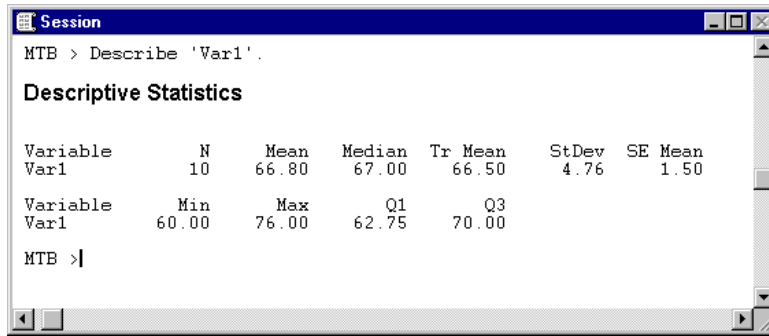
Minitab provides many different tools for analysing data. For example, to derive some basic, descriptive statistics for one of the columns of data entered previously :

- ⇒ Open the Stat menu or press ALT-S
- ⇒ Choose Basic Statistics or press B
- ⇒ Choose Display Descriptive Statistics to produce a dialogue box
- ⇒ Double-click on the column name or number in the list on the left. The name will appear in the Variables box on the right:



- ⇒ Click OK.

The output will appear in the Session window like this:



Saving Output

To save the output shown in the Session window, make sure the Session window is the active window then choose **Save Session Window As** from the File menu and type in a name for the file to contain the saved output.

In the course of a Minitab session, you may generate many lines of output, commands and comments in the Session window. The Session window will normally hold up to 15,000 lines.

Remember that the contents of the Session window are separate from your worksheet and are not saved when you save the worksheet.

You can save output in two formats; Text (ASCII) files do not contain any of the fonts that you see in the Session window, while Rich Text Format (.rtf) files retain the fonts. Both formats can be opened in most word processors.

You can also save the contents of the Session window using Minitab's **OUTFILE** command at the **MTB>** prompt.

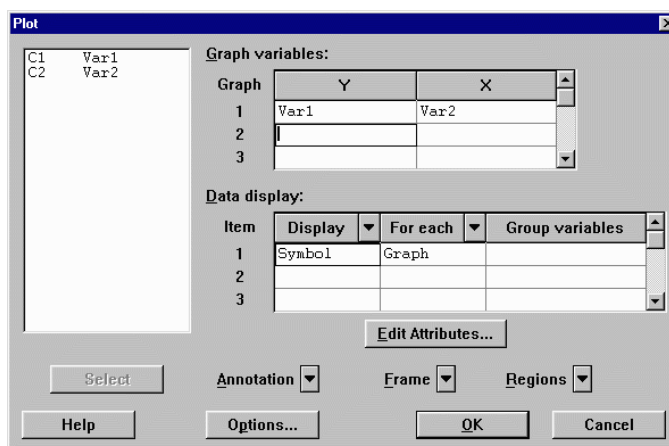
If you always want the contents of the Session window saved, you can change your preferences so that the session contents are saved or discarded automatically.

Producing Graphs

High-resolution graphs are produced by default, each graph appearing in its own window. To plot a simple graph of your data:

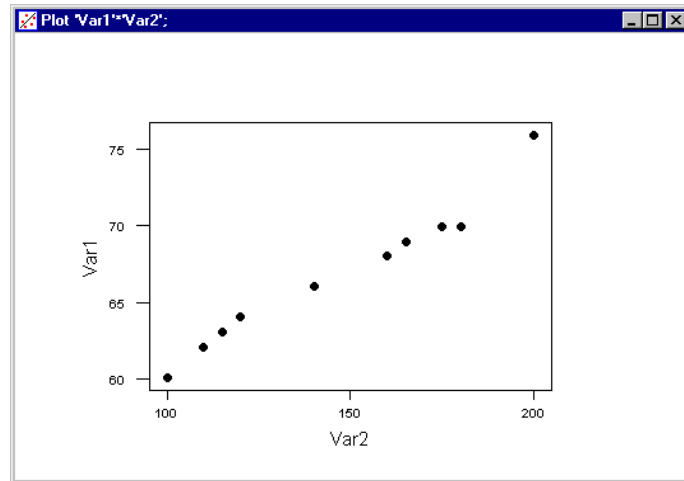
⇒ Choose **Plot** from the Graph menu to display the Plot dialogue box:

⇒ Specify a **Column number or name** for the Y-axis and one for the X-axis. You can type the names of the columns in the Y and X text boxes, or you can double-click on the column names in the **Select** box on the left:



- ⇒ Click on the Annotation button and choose Title from the list.
- ⇒ Type the title for your plot in the first line of the Title subdialogue box.
- ⇒ Click OK in the Title subdialogue box, and click OK again in the Plot dialogue box.

The output will appear in a new Graph window like this:



There are many other types of graph available.

Graph Editing Once you have created a graph, you can edit it in various ways using special Tool and Attribute palettes. To enter editing mode double-click on the graph itself or choose Edit from the Editor menu. The palettes should appear to one side of the screen. They contain tools for adding text, various shapes and lines.

Printing Graphs To obtain printout of a graph make sure the graph window is active then choose Print Graph from the File menu.

Saving Graphs To save a graph in Minitab format:

- ⇒ Make the graph window active.
- ⇒ Choose Save Graph As from the File menu
- ⇒ Type in a file name. The extension .mgf will be automatically added.

You can open the graph at a later date and continue editing it by choosing Open Graph from the File menu

Exporting Graphs Because high-resolution graphs can be saved in standard Windows file formats you can import Minitab graphs into word processing and graphics applications to prepare reports and presentations.

If you want to use a graph in another application, there are several ways of exporting it. The easiest way is to copy the graph to the Windows clipboard by choosing Copy Graph from the Edit menu. Then switch to the other application and choose Paste from its Edit menu.

Alternatively, save the graph as a bitmap or an encapsulated PostScript file. To save the graph as a bitmap file:

- ⇒ Press ALT-PRINT SCREEN to copy the Minitab window.
- ⇒ Paste the saved image into the Windows Paint application.
- ⇒ Edit the image as necessary.

⇒ Save the image as a bitmap.

To save as a PostScript file, check Print to file in the Print dialogue box and enter a name for the file when prompted.

Character Graphics

It is also possible to produce low resolution, character graphs, using simple keyboard characters (ASCII text). These print on any printer and can be stored using very little disk space. Character graphs also work well with text-based electronic mail systems. To produce a character graph, select from the Character Graphs option in the Graphs menu.

The Command Line Editor

This provides a quick way to edit and re-execute commands executed earlier in your session. To use the command line editor:

⇒ Highlight some or all of the commands displayed in the Session window. It is okay if you highlight output as well as commands.

⇒ Choose Command Line Editor from the Edit menu. The highlighted commands will appear in the command line editor dialogue box.

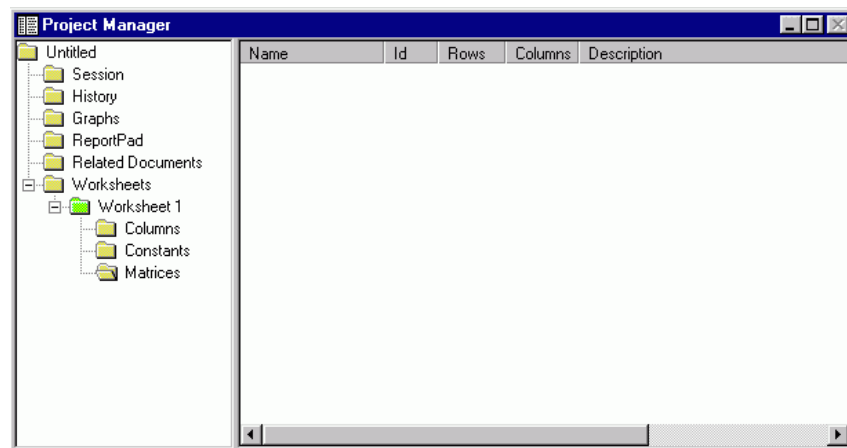
⇒ Edit the commands so they appear as you would like the commands to be executed. You can add new commands if you choose. Use CTRL+ENTER for a carriage return.

Press ENTER to resubmit the commands for execution.

The Project Manager

All the worksheets, session commands, graphs and reports of a Minitab session constitute a Project. The Project Manager provides a means of viewing, navigating and manipulating these various components.

To open the Project Manager, choose Project Manager from the Window menu. A list of folders appears on the left hand side of a new window:



The Project Manager contains folders that allow you to navigate, view, and manipulate various parts of your project. By right-clicking on either the folders or the folder contents, you can access a variety of menus that allow you to manage Session window output, graphs, worksheets, command language, and related project areas.

The Session Folder	The Session folder contains a list of all Session window output by command and all graphs. Use this folder to manage Session window output, for instance to jump to Session window output, copy, delete, rename, or print Session window output or graphs or to append Session window output or graphs to the ReportPad
The History Folder	The History folder displays all session commands, without the output. This folder provides a convenient overview of what you have done in your session. If you use the Data window to change the worksheet, a note is generated in the History folder.
	You can use the History folder for example to select command(s), then open the Command Line Editor where the command(s) you selected will automatically appear enabling you to quickly re-execute them.
	You can also create a Minitab macro for repeating an analysis by first working through the steps using the menus and dialogue boxes, then copying the resulting session commands from the History folder, pasting into a word processor. See <i>Creating a Simple Macro in Session Command Help</i> .
	Note that you cannot change the contents of the History folder.
The Graphs Folder	You can use the Graphs folder in the Project Manager to manage multiple Graph windows. By highlighting the graphs from the list in the Graphs folder and right-clicking with the mouse, you can:
	<ul style="list-style-type: none"> • Save, Copy, or Print one or more graphs • Tile multiple graphs across the Minitab screen for easy viewing and comparison • Rename individual graphs • Append graphs to the ReportPad folder
The ReportPad Folder	You can quickly create reports of your data in the Project Manager ReportPad folder using Append to Report. Use the ReportPad folder to store graphs, Session window output, and text (such as user comments and notes). All output in the ReportPad folder is fully editable, and you can save the contents of the ReportPad folder as an RTF (Rich Text Format) file that can be displayed in other applications. You can edit and print the reports directly from the ReportPad folder, or open and edit them in a word processing program for enhanced formatting options.
Related Documents Folder	The Related Documents folder contains a list of program files, documents or internet URLs that are related to your Minitab project. This enables you to quickly access project-related, non-Minitab files for easy reference
The Worksheet Folder	The Worksheet folders and their subfolders (Columns, Constants, and Matrices) contain an automatically updated summary of the current worksheet. They are especially useful to help you keep track of variables if you have a large worksheet. The Worksheet folders' subfolders provide the following information:
	Constants, matrices, and design summaries are each displayed in their own separate subfolders within the Worksheet folder.

Columns

For each column containing data, the Columns subfolder displays the column name, column ID, number of rows, number of missing values, column type, and column description. A T under Type marks text columns, a D under Type marks date/time data, and an N under Type marks numeric data.

Constants

For each constant containing data, the constant name, the constant ID, the value of the constant, and the description of the constant.

Matrices

For each matrix, the matrix name, the matrix Id, the number of rows in the matrix, the number of columns in the matrix, and the matrix description.

Designs

The Design subfolder displays Factors, Runs, Blocks, Base Design, Replicates, and Center points, as well as the display order and display units, and the factors and their uncoded levels.

Ending A Session When you have finished working in Minitab, make sure that you have saved any data, graphs or session information you wish to keep, then choose Exit from the File menu. If there is information that has not been saved, you will be prompted to save it.

Minitab Appendix Main Menu

- File New - opens a new worksheet or project.
- Open Project - opens a project file.
- Save Project - saves the current project.
- Save Project As - saves the current project with a different name.
- Project Description - edits a description of the current project.
- Open Worksheet - copies data from a file (Minitab, Excel, Lotus, text, and others), replacing the current worksheet.
- Query Database (ODBC) - imports data from a database file, such as one saved by Microsoft Access, Oracle, Sybase, or SAS into the Minitab worksheet.
- Save Current Worksheet - saves the current worksheet in an existing MTW or MTP file.
- Save Current Worksheet As - saves worksheet data in a file, with a choice of many different file formats.
- Close Worksheet - closes the current worksheet.
- Open Graph - opens a Minitab graph (MGF) file.
- Save Session Window As - saves the Session window content to a file.
- Save History As - saves the History folder content to a file.
- Save Graph As - saves the current Graph window to a file.

Other Files - displays commands for importing and exporting special text files, and for running an Exec.

Print Session Window - prints the Session window.

Print History - prints the History.

Print Graph Window - prints the current Graph window.

Print Worksheet - prints the contents of the current Data window.

Print Setup - defines printer specifications.

Exit - exits Minitab.

Most Recently Used Worksheets - The bottom of the File menu lists the most recently used worksheets. Click any worksheet listed to open it.

Edit **Undo** - undoes your most recent editing operation.

Clear/Clear Cells - erases the contents of the highlighted cells, without moving rows up or columns left.

Delete/Delete Cells - deletes the highlighted text or data.

Copy/Copy Cells - copies the highlighted text or data to the Clipboard.

Cut/Cut Cells - removes the highlighted text or data and copies it to the Clipboard.

Paste/Paste Cells - copies the contents of the Clipboard to the current position in the active window.

Paste Link - creates a new Dynamic Data Exchange link by pasting an existing link into a Data window.

Links - creates new Dynamic Data Exchange (DDE) links; changes or removes existing links; gets external data, or executes an external command.

Select All/Select All Cells - highlights everything in the active window.

Edit Last Dialog - opens the most recently used dialog box, with the same selections from the last time you used it.

Command Line Editor - allows you to execute session commands and/or edit and re-submit previously executed commands.

Preferences - allows you to specify numerous options to customize your Minitab environment.

Manip **Subset Worksheet** - copies specified rows from the active worksheet to the new worksheet.

Split Worksheet - splits or unstacks the active worksheet into two or more new worksheets based on one or more variables.

Merge - combines two worksheets into one new worksheet.

Sort - sorts one or more columns of data.

Rank - assigns rank scores to values in a column.

Delete Rows - deletes specified rows from columns in the worksheet.

Erase Variables - erases any combination of columns, stored constants and matrices.

Copy Columns - copies columns from one position in the worksheet to another; can copy entire columns or a subset.

Stack - stacks columns on top of each other to make longer columns.

Unstack - unstacks (or splits) columns into shorter columns.

Transpose Columns - switches columns to rows.

Concatenate - combines two or more text columns side by side into one new column.

Code - recode values in columns.

Change Data Type - changes columns from one data type (such as numeric, text, or date/time) to another.

Display Data - displays data from the current worksheet in the Session window.

Calc **Calculator** - does arithmetic using an algebraic expression, which may contain arithmetic operations, comparison operations, logical operations, and functions.

Column Statistics - calculates various statistics based on a column you select.

Row Statistics - calculates various statistics for each row of the columns you select.

Standardize - centers and scales columns of data.

Extract from Date/Time to Numeric/Text - extracts one or more parts of a date/time column, such as the year, the quarter, or the hour, and saves that data in a numeric or a text column.

Make Patterned Data - provides an easy way to fill a column with numbers or date/time values that follow a pattern. See also **Generating Patterned Data Overview** for related information.

Make Mesh Data - creates a regular (x,y) mesh to use for drawing contour, 3D surface and wireframe plots, with the option to create the z-variable as well.

Make Indicator Variables - creates indicator (dummy) variables that you can use in regression analysis. See also **Generating Patterned Data Overview** for related information.

Set Base - fixes a starting point for Minitab's random number generator.

Random Data - displays commands for generating a random sample of numbers, sampled either from columns of the worksheet or from a variety of distributions

Probability Distributions - displays commands to compute probabilities, probability densities, cumulative probabilities, and inverse cumulative probabilities for continuous and discrete distributions.

Matrices - displays commands for doing matrix operations.

Stat	<p>Basic Statistics</p> <p>Regression</p> <p>ANOVA (Analysis of Variance)</p> <p>DOE (Design of Experiments)</p> <p>Control Charts</p> <p>Quality Tools</p> <p>Reliability/Survival</p> <p>Multivariate</p> <p>Time Series</p> <p>Tables</p> <p>Nonparametrics</p> <p>EDA (Exploratory Data Analysis)</p> <p>Power and Sample Size</p>
Graph	<p>Layout - lets you specify where a single graph or several graphs appear on one page.</p> <p>Plot - produces scatter plots, line plots, area plots, and spike plots.</p> <p>Time Series Plot - produces time series plots.</p> <p>Chart - generates bar charts, line charts, area charts and other types of charts.</p> <p>Histogram - generates histograms.</p> <p>Boxplot - produces box-and-whisker plots.</p> <p>Matrix Plot - produces a two-dimensional matrix of separate scatter plots where the input columns are used for either row or column variables, depending on the order in which you list them.</p> <p>Draftsman Plot - produces a two-dimensional matrix of separate scatter plots where you specify which columns should be used for row variables and which should be used for column variables.</p> <p>Contour Plot - produces contour plots.</p> <p>3D Plot - displays a three-dimensional plot.</p> <p>3D Wireframe Plot - displays a three-dimensional plot of a surface drawn with a wireframe grid.</p> <p>3D Surface Plot - displays a three-dimensional plot of a smooth surface.</p> <p>Pie Chart - generates pie charts.</p> <p>Dotplot displays individual points along a number line.</p> <p>Marginal Plot - produces scatter plots with histograms, boxplots, or dotplots in the margins.</p> <p>Probability Plot - assess whether a particular distribution fits data.</p>

	Stem-and-Leaf - produces a character based stem-and-leaf.
	Character Graphs - displays options that produce a variety of character (as opposed to high-resolution) graphs.
Editor	Editor Menu commands are dynamic and change depending on which window is active. Includes Find and Replace, formatting and insert/delete functions.
Window	<p>Cascade - arranges all open Minitab windows so that they overlap with each title bar visible (if possible).</p> <p>Tile - arranges all open Minitab windows so they fit next to each other on the desktop and do not overlap (if possible).</p> <p>Minimize All - reduces all open windows to icons and places them at the bottom of the screen.</p> <p>Restore Icons - opens all icons into windows, sized as they were when last reduced to icons within the session.</p> <p>Arrange Icons - arranges icons along the bottom of the Minitab window.</p> <p>Refresh - redraws the graph in the active window.</p> <p>Standard Toolbar - display or hide the Standard Toolbar</p> <p>Project Manager Toolbar - display or hide the Project Manager Toolbar.</p> <p>Status Bar - display or hide the Status Bar.</p> <p>Close All Graphs - closes all Graph windows.</p> <p>Set Graph Size/Location - determines how Minitab will display Graph windows.</p> <p>Session <Ctrl>+<M> - switches you to the Session window, where you can enter session commands and/or view analysis results.</p> <p>Project Manager - switches you to the Project Manager window, where you can manage windows, graphs, worksheets, related documents, and project information.</p> <p>Worksheets and Graphs - all open Graph and Data windows are listed at the bottom of the Window menu. Click on any window name to activate the window and bring it to the front of Minitab. See Multiple Graph Windows Limit for important information on graphs.</p>
Help	<p>Help - displays a table of contents of information in the Help system.</p> <p>Search Help - opens the Windows Index dialog box. Type keywords to find topics, just like you would skim an index in a printed manual.</p> <p>How to Use Help - explains how to use the Windows Help system, including how to print, copy and paste Help text.</p> <p>StatGuide - displays the welcome page.</p> <p>Search the StatGuide - opens the table of contents.</p> <p>How to Use the StatGuide - opens the How to Use the StatGuide Help file.</p>

Tutorials - opens the Tutorials, which walk you through five sample sessions of MINITAB 13, showing you step-by-step how to perform a broad range of analyses.

Search Tutorials - opens the Windows Search or Windows 95 dialog box. Type keywords to find topics, just like you would skim an index in a printed manual.

Session Command Help - opens Session Command Help containing documentation on each session command, including syntax and examples.

Search Session Command Help - opens the Windows Search or Windows 95 dialog box. Type keywords to find topics, just like you would skim an index in a printed manual.

Minitab on the Web - At Minitab Inc.'s web site you can get answers to common technical questions, download macros, and download free maintenance releases of Minitab. Go to [HTTP://www.minitab.com/](http://www.minitab.com/) and follow the support links.

About Minitab - displays the serial number, product name, release number, and other information.