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GRAPH

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Viewing Style

The Graph Object supports three viewing styles.

Color

Monochrome

Monochrome with Symbols

This customization allows you to quickly adjust the image to best suite printing on a monochrome printer. If fewer than four subsets are to be included in a graph, then the Monochrome setting will probably be the best choice. If four or more subsets are to be included in the graph, then Monochrome with Symbols will help distinguish the different subsets.

Graph

Font Size

The Graph Object supports three font sizes, Large, Medium, and Small. Depending on the size of the graph, the user can select the font size that is most readable. When printing the graph, a font size of Medium or Small is suggested.

There are occasions, (mainly when attempting to generate an image for a highly rectangular graph) the graph may automatically reduce the size of the font in order to produce a higher quality image.

Graph

Plotting Method

The Graph Object has 20 possible plotting methods;

- Line
- Bar
- Point
- Area
- Stacked Area
- Stacked Area Percent
- Stacked Bar
- Stacked Bar Percent
- Points plus Best-Fit-Line
- Points plus Best-Fit-LineII (Best-Fit-Line for graphed points)
- Points plus Best Fit Curve
- Points plus Best Fit Curvell (Best Fit Curve for graphed points)
- Points plus Spline
- Spline
- High-Low-Bar
- High-Low-Line
- High-Low-Close
- Open-High-Low-Close
- Box-Plot
- Histogram

Depending on the implementation, some plotting methods may not be available.

The Graph Object can display up to 14 subsets at once, however, it is suggested that no more than three subsets should be displayed at any one time.

The Histogram plotting method displays a histogram of the data that is currently selected. The Histogram is most meaningful with larger data sets (at least 15 data points). If the Histogram is for only one subset, then bars represent the number of occurrences. If the Histogram is for multiple subsets, then lines will represent the different frequency distributions.

Graph

Data Shadows

Depending on the Plotting Method, this option will draw shadows behind the bars, lines, points and areas of the graph. The shadow is always black.

Graph

Graph and/or Table

The Graph Object can display a graph, table, or both graph and table.

The font size of the text inside the table depends on the number of points, and the numeric precision of the output. The more points and higher precision that is attempted to be tabled, the smaller the font must be in order for the information to fit.

Graph

What to Table

If the Graph Object is currently displaying a table, then the table can include (1) the subset(s) that are currently selected to be graphed, or (2) all subset information that is included into the object.

If All Subsets are being tabled then those subsets that are currently graphed will be highlighted.

If the table includes only those subsets that are graphed, and permanent subsets are displayed along with scrolling subsets, then permanent subsets will be highlighted.

Graph

Grid Lines

The Graph Object can contain vertical grid lines, horizontal grid lines, both vertical and horizontal grid lines, or no grid lines.

Graph

Grid in front of data

By checking this option, the graph's grid is placed in front of the data graphics. Otherwise, the data graphics are drawn on top of the graph's grid.

Graph

Numeric Precision

When placing information into a table, or exporting Text/Data from the Export Dialog, the number of decimal positions can be between 0 to 3.

Graph

Points to Graph

If the Graph Object contains a data set with many points, then it may be hard to table or even graph all of the information at one time. The Graph Object gives you two methods for viewing a smaller amount of points, thus making the information more readable.

Sequential

When choosing the Sequential method, you use the scrollbar to adjust the amount of points to graph. If the amount chosen is less than the total number of points, then a horizontal scrollbar will be visible, allowing you to scroll left and right through the rest of the data.

Selected (Random)

When choosing the Selected method, you use the list box to select the points to place in the graph.

Vertical Point Labels

This checkbox controls whether point labels will be automatically orientated (unchecked) or manually forced to vertical orientation (checked). If horizontal point labels are too small to read, then checking the option will force them larger.

Graph

Subsets to Graph

This group allows the user to view subset information in a variety of ways.

1. If nothing is selected in the listbox and Scrolling Subsets equals zero, then the object will display all subset information (14 subsets graph maximum, and no limit on the amount of subsets tabled.)
2. If there are selections in the listbox and Scrolling Subsets equals zero, then the object will display only those subsets selected.
3. If nothing is selected in the listbox and Scrolling Subsets is non-zero, then the object will scroll through subset information by the amount defined by Scrolling Subsets.
4. If there are selections in the listbox and Scrolling Subsets is non-zero, then the object will maintain those selected subsets as permanent subsets and revolve through the remaining subsets in increments of Scrolling Subsets.

The following table summarizes the Subsets to Graph variations.

Selected Subsets	Scrolling Subsets	Result
no	no	Display all subsets.
yes	no	Display only those selected subsets.
no	yes	Scroll through all subsets.
yes	yes	Permanent selected subsets & scroll through remaining subsets.

Comparisons as Normal

Subset labels which are preceded by an asterisks are comparison subsets. Comparison subsets are only displayed when selected, and are plotted as a thin line. However, if the Comparisons as Normal checkbox is checked, the comparison subsets will be plotted in the current Plotting Method.

Graph

Fonts

The Graph Object only supports True Type fonts (because their scaleable). The user can select fonts for the:

Main Title

Sub Title

Labels Including , X axis label, Y axis label,
X axis grid numbers or point labels,
Y axis grid numbers.

Tabled Data

For the Main Title, Sub Title, and Labels, the user can also select font attributes of Boldness, Italics, and Underline.

Graph

Colors

The Graph Object supports two sets of color parameters. A Monochrome color set and a Color color set. Depending on the Viewing Style, the Colors Dialog will customize the appropriate set.

To adjust colors:

1. Select the desired object attribute in the Graph Attributes section. The corresponding color for that attribute will be highlighted in the color selection grid.
2. To change the color, either use the mouse to click an alternate color, or use the keyboard arrow keys to move to adjacent colors. As the highlighted color selection changes position, the sample image will be updated with the newly selected color.
3. If you wish to make a custom color, select one of the color selections on the bottom row of the color selection grid. Click the Customize button, and in place of the sample image, there will be scrollbars allowing you to control the Red, Green, Blue contents of the custom color. Choose the OK button when finished customizing the color.
4. Finally, Pressing the OK button will update the color parameters of the object.

Desk Background

This is the color that surrounds the bounding rectangle of the graph's grid.

Desk Foreground

This is the color that is used when placing text onto the Desk Background. This includes the main title, sub title, subset/point labels, grid numbers, and axis labels.

Shadow Color

The rectangles that make up the graph's grid and table and bounded at the bottom/right edges with shadows. To remove the shadows, choose the same color as the Desk Background.

Graph Background

This is the color used as the background color of the graph's grid.

Graph Foreground

This is the color used for the bounding rectangles of the grid, the grid-lines of the graph, and lines that are used to bound some of the plotting methods (like the bounding line around bars of the Bar Plotting Method).

Table Background

This is the color used in filling the table's rectangle.

Table Foreground

This is the color used in bounding the table's rectangle, and for the text inside the table.

Graph

Scientific Graph

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Viewing Style

The Scientific Graph Object supports three viewing styles.

Color

Monochrome

Monochrome with Symbols

This customization allows you to quickly adjust the image to best suite printing on a monochrome printer. If fewer than four subsets are to be included in a graph, then the Monochrome setting will probably be the best choice. If four or more subsets are to be included in the graph, then Monochrome with Symbols will help distinguish the different subsets.

Scientific Graph

Font Size

The Scientific Graph Object supports three font sizes, Large, Medium, and Small. Depending on the size of the graph, the user can select the font size that is most readable. When printing the graph, a font size of Medium or Small is suggested.

There are occasions, (mainly when attempting to generate an image for a highly rectangular graph) the graph may automatically reduce the size of the font in order to produce a higher quality image.

Scientific Graph

Subsets to Graph

This group allows the user to view subset information in a variety of ways.

1. If nothing is selected in the listbox and Scrolling Subsets equals zero, then the object will display all subset information (14 subsets graph maximum, and no limit on the amount of subsets tabled.)
2. If there are selections in the listbox and Scrolling Subsets equals zero, then the object will display only those subsets selected.
3. If nothing is selected in the listbox and Scrolling Subsets is non-zero, then the object will scroll through subset information by the amount defined by Scrolling Subsets.
4. If there are selections in the listbox and Scrolling Subsets is non-zero, then the object will maintain those selected subsets as permanent subsets and revolve through the remaining subsets in increments of Scrolling Subsets.

The following table summarizes the Subsets to Graph variations.

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no	yes	Scroll through all subsets.
yes	yes	Permanent selected subsets & scroll through remaining subsets.

Comparisons as Normal

Subset labels which are preceded by an asterisks are comparison subsets. Comparison subsets are only displayed when selected, and are plotted as a thin line. However, if the Comparisons as Normal checkbox is checked, the comparison subsets will be plotted in the current Plotting Method.

Scientific Graph

Plotting Method

The Scientific Graph Object has 8 plotting methods;

Point

Line

Sticks

Points plus Best-Fit-Line

Points plus Best Fit Curve

Points plus Spline

Spline

Bubble

Depending on the implementation, some plotting methods may not be available.

The Scientific Graph Object can display up to 14 subsets at once, however, it is suggested that no more than three subsets should be displayed at any one time.

Scientific Graph

Data Shadows

Depending on the Plotting Method, this option will draw shadows behind the lines, points and sticks of the graph. The shadow is always black.

Scientific Graph

Grid Lines

The Scientific Graph Object can contain vertical grid lines, horizontal grid lines, both vertical and horizontal grid lines, or no grid lines.

Scientific Graph

Grid in front of data

By checking this option, the graph's grid is placed in front of the data graphics. Otherwise, the data graphics are drawn on top of the graph's grid.

Scientific Graph

Numeric Precision

When placing data labels onto the graph, or exporting Text/Data from the Export Dialog, the number of decimal positions can be between 0 to 3.

Include Data Labels

If this option is checked then the object's plotting method will include Data Labels into the graph. Depending upon the implementation, Data Labels will either be numeric values, or text descriptors.

Scientific Graph

Fonts

The Scientific Graph Object only supports True Type fonts (because their scaleable). The user can select fonts for the:

Main Title

Sub Title

Labels Including , X axis label, Y axis label,
X axis grid numbers or point labels,
Y axis grid numbers.

Tabled Data Data labels included into the graph.

For the Main Title, Sub Title, and Labels, the user can also select font attributes of Boldness, Italics, and Underline.

Scientific Graph

Colors

The Scientific Graph Object supports two sets of color parameters. A Monochrome color set and a Color color set. Depending on the Viewing Style, the Colors Dialog will customize the appropriate set.

To adjust colors:

1. Select the desired object attribute in the Graph Attributes section. The corresponding color for that attribute will be highlighted in the color selection grid.
2. To change the color, either use the mouse to click an alternate color, or use the keyboard arrow keys to move to adjacent colors. As the highlighted color selection changes position, the sample image will be updated with the newly selected color.
3. If you wish to make a custom color, select one of the color selections on the bottom row of the color selection grid. Click the Customize button, and in place of the sample image, there will be scrollbars allowing you to control the Red, Green, Blue contents of the custom color. Choose the OK button when finished customizing the color.
4. Finally, Pressing the OK button will update the color parameters of the object.

Desk Background

This is the color that surrounds the bounding rectangle of the graph's grid.

Desk Foreground

This is the color that is used when placing text onto the Desk Background. This includes the main title, sub title, subset labels, grid numbers, and axis labels.

Shadow Color

The rectangle that make up the graph's grid is bounded at the bottom/right edges with shadows. To remove the shadows, choose the same color as the Desk Background.

Graph Background

This is the color used as the background color of the graph's grid.

Graph Foreground

This is the color used for the bounding rectangle of the grid, and the grid-lines.

Scientific Graph

Zooming

Zooming is the process of using the mouse to select new extents of the graphs grid.

To Zoom:

1. Press and hold the Shift key.
2. Press the left mouse button and drag the cursor to select the new extents.
3. Release the mouse button.

To Undo the Zoom:

Press the Z key or use the popup menu to select the Undo Zoom menu item.

Pie Chart

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Viewing Style

The Pie Chart Object supports two viewing styles.

Color

Monochrome

This customization allows you to quickly adjust the image to best suite printing on a monochrome printer.

Pie Chart

Font Size

The Pie Chart Object supports three font sizes, Large, Medium, and Small. Depending on the size of the graph, the user can select the font size that is most readable. When printing the graph, a font size of Medium or Small is suggested.

There are occasions, (mainly when attempting to generate an image for a highly rectangular graph) the graph may automatically reduce the size of the font in order to produce a higher quality image.

Pie Chart

Slice Parameters

Default Behavior

The pie chart is created with all slice information included, and default slices exploded.

Custom Slices to Explode

In the listbox, select the custom slice or slices which you wish to explode.

Custom Slices to Include

In the listbox, select those slices which you want to use to make up the pie chart. You must select at least two slices.

Pie Chart

Numeric Precision

When placing data labels next to the slices, or exporting Text/Data from the Export Dialog, the number of decimal positions can be between 0 to 3.

[Pie Chart](#)

Grouping Small Percentages

The Pie Chart can group smaller percentages into one slice (Other). The scrollbar controls what percentages get placed into the Other slice. Percentages smaller than that selected will be forced into the Other slice. This feature will prevent sliver pieces that cause the text percentage labels to crowd into each other.

[Pie Chart](#)

Data Shadows

This option will draw shadows behind the pie slices. The shadow is always black.

Pie Chart

Fonts

The Pie Chart Object only supports True Type fonts (because their scaleable). The user can select fonts for the:

Main Title

Sub Title

Labels Slice label

Tabled Data Percentage / Value

For the Main Title, Sub Title, and Labels, the user can also select font attributes of Boldness, Italics, and Underline.

Pie Chart

Colors

The Pie Chart Object supports two sets of color parameters. A Monochrome color set and a Color color set. Depending on the Viewing Style, the Colors Dialog will customize the appropriate set.

To adjust colors:

1. Select the desired object attribute in the Graph Attributes section. The corresponding color for that attribute will be highlighted in the color selection grid.
2. To change the color, either use the mouse to click an alternate color, or use the keyboard arrow keys to move to adjacent colors. As the highlighted color selection changes position, the sample image will be updated with the newly selected color.
3. If you wish to make a custom color, select one of the color selections on the bottom row of the color selection grid. Click the Customize button, and in place of the sample image, there will be scrollbars allowing you to control the Red, Green, Blue contents of the custom color. Choose the OK button when finished customizing the color.
4. Finally, Pressing the OK button will update the color parameters of the object.

Desk Background

This is the color that surrounds the bounding rectangle of the pie chart.

Desk Foreground

This is the color that is used when placing text onto the Desk Background. This includes the main title, and sub title.

Shadow Color

The rectangle that bounds the pie chart is bounded at the bottom/right edges with shadows. To remove the shadows, choose the same color as the Desk Background.

Graph Background

This is the color used as the fill color for the bounding rectangle of the pie chart.

Graph Foreground

This is the color used for the bounding rectangle of the pie chart, and the slice labels.

Pie Chart

Mouse and Keyboard Control

Mouse:

The mouse can be used as follows.

1. Single-Clicking the mouse over objects will give that object the input focus.
2. Controlling object scrollbars, and selecting Hot-Spots.
3. Right-Button Single-Clicking invokes a popup menu.
4. Double-Clicking a data point shows the value of the data point.
5. Double-Clicking inside a graphs grid shows the coordinates clicked.
6. Double-Clicking desk portion of object invokes the customization dialog.

Keyboard:

The objects can also receive the following keyboard commands.

SPACEBAR	Shows the customization dialog.
Q	Shows a popup menu.
S	Switches between monochrome and color styles.
T	Toggles between custom and original parameters.
C	Shows the color selection dialog.
F	Shows the font selection dialog.
X	Shows the export dialog.
M	Maximizes the object to fit the screen.
P	Shows the print dialog.
D	Shows the Text/Data export dialog.
Z	Undo Zoom (Graph and Scientific Graph only)
ARROWS	Scrolls both vertical and horizontal scrollbars by one line.
PG-UP/PG-DOWN	Pages vertical scrollbar.
SHIFT+PG-UP	Pages horizontal scrollbar to the right.
SHIFT+PG-DOWN	Pages horizontal scrollbar to the left.
HOME	Moves vertical scrollbar to its first position.
END	Moves vertical scrollbar to its last position.
SHIFT+HOME	Moves horizontal scrollbar to its left-most position.
SHIFT+END	Moves horizontal scrollbar to its right-most position.

Customizations

All objects have their own individual customization dialogs. The customization dialogs allow the user to adjust visual, and functional attributes of the object. The customization dialogs also allow the user mouse activation of the Export and Maximization dialogs.

Custom and Original Parameters

All objects store two sets of customization parameters. The first set is known as the Original set. The Original set is programmed into the control and the user can not adjust these parameters. The second set is called the Custom set. The Custom set can be adjusted through the customizations dialog. While the object has the input focus, PRESSING T will toggle between the Original and Custom parameter sets.

Showing the Customizations Dialog

DOUBLE-CLICKING the MOUSE over the object, or
PRESSING SPACEBAR while the object has the input focus will show the customization dialog.

How to

When the customization dialog is shown, the parameters it shows reflect the current state of the object. By making adjustments to the customization dialog and then pressing the OK Button, the user updates the Custom set of parameters controlling the object. By pressing the Original Button the object will show the object with the Original set of parameters.

The Color Button and Font Button show dialogs to allow adjustment of color and font attributes. To change colors or fonts, press the button to show the dialog, make your adjustments and then press the OK Button to close the Colors/Fonts dialog and update the Custom set of parameters.

**Note, the customization dialog can not be used to toggle between the Original and Custom set of parameters. This is because pressing the OK Button creates a new Custom set of parameters. To toggle between Original and Custom sets of parameters, press the (T) key while the object has the input focus.

Exporting

All objects have the same exporting capabilities. Objects can export the following formats to the listed destinations.

FORMAT	DESTINATIONS
Metafile	Clipboard, File, and Printer.
Bitmap	Clipboard, and File.
OLE Object	Clipboard.
Text / Data	Clipboard, and File.

How to

By Pressing 'X' when the object has the focus, or selecting the Export button from the Customizations Dialog.

1. Select the type of export desired.
2. Select the destination of the export.
3. If available, select the size of the image to export.
4. Press the Export/Print button.

File Destination

If information is to be exported to a file, then you must enter a target filename. Click the mouse over the Browse button to show the File Save As Dialog. Enter a filename and select OK to close the File Save As dialog.

Printer Destination

If your exporting a metafile to the printer, pressing the Print button will show the Print Dialog. Use the Print Dialog to make changes to the selected printer, orientation, paper bin, and other printer options.

Exporting an OLE Object

When exporting an OLE Object, you paste the object into an OLE container. The object is supported by the OLE-MiniServer PEGRPSVR.EXE.

Exporting Text /Data

When exporting Text/Data, pressing the Export button launches the Text/Data Export Dialog.

Text / Data Export Dialog

Data to Export

You can export all the information from the object, or export only that data which you select in the two listboxes (Subsets to Export, & Points to Export.) If you choose to select the information to export, leaving a listbox empty of selections will cause all the information to be exported.

What to Export

You can export the data with or without subset and point labels. Depending on the object, you are offered several possible selections of data to export.

Export Format

You can export the information in two formats;

1. Table Format - which exports the information in a grid fashion in either a Subset by Point or Point by Subset style.
2. List Format - which exports the information one record per line. The data fields can either be separated by tabs or commas.

Export Precision

The data's export precision can either be the current precision state of the object, or 7 decimal positions (the maximum precision stored by the object).

File Save As Dialog

Filename

This text box is used to (1) enter the filename, or (2) enter a wildcard expression used to fill the file listbox below. If a wildcard expression is entered, then press the OK button to fill the file listbox.

Files Listbox

This listbox shows the files that are located in the current working directory and satisfy either the wildcard expression that is in the Filename listbox or the wildcard expression that is selected in the File Type Combobox.

File Type Combobox

This dropdown list allows you to quickly change the types of files you want listed in the Files Listbox.

Directories Listbox

This listbox allows you to change the current directory. By choosing a selection and pressing 'Enter or by Double-Clicking a selection, the working directory will change to that selected.

Drives Combobox

This dropdown list shows the available drives on your system. It will also show any network drives that are available.

Print Dialog

The Print Dialog will show the default printer and its current orientation and paper bin. The user can select another printer via the dropdown combobox which will display all available system and network printers. If printer orientation, paper bin, or other printer option needs to be adjusted, press the Setup button to invoke the printer's setup dialog.

Scrolling Subsets Print Options

If the object that is being exported has scrolling subsets (a vertical scrollbar), then the Print Dialog offers two optional ways to export the object.

1. Printing the current image only.
2. Printing the current image and then paging through additional subset information, printing new pages with each new set of subset information. This provides a quick, clear way to print all of the object's information. To print all of the object's information, make sure that the object's vertical scrollbar is in its top most position (prior to exporting), and that the scrollbar controlling the number of additional pages to revolve through is in its right most position (maximum position).

Maximization

Maximization is the process of resizing the object to use the entire video display.

All ProEssentials objects support maximization (if available.) When maximizing the object, the object is actually copied to a maximized dialog. The dialog (maximized object) can be closed by pressing 'Escape' or by using the mouse to Click the title bar. Making customizations to the maximized object will not effect the original (non-maximized) object.

Object Embedding

When exporting a Metafile or Bitmap, you are exporting an image. Once the image is exported it is difficult to make adjustments to the image (like transforming a color image in to a monochrome image.) Exporting an OLE object will solve this problem.

The ProEssentials objects allow the user to adjust both visual and functional attributes of the object. Also, the ProEssentials objects also take commands to revolve through various subsets of data and scroll horizontally through large amounts of point data. All this functionality will be lost if you export a Metafile or Bitmap. However, if you export an OLE object, all this functionality will still be accessible.

You export the ProEssentials object as an OLE object to the clipboard. You then paste the OLE object into a document or other OLE container. Once the OLE object has been embedded into the container, it looks as if you have imported a simple Metafile. However, Double-Clicking the OLE object will invoke PEGRPSVR (ProEssentials Graphic Server.) PEGRPSVR will display the object and allow all the same functionality as if the object were in its original application.

ProEssentials Graphic Server

PEGRPSVR is an OLE Mini-Server. It is the program that serves the ProEssentials objects exported from an application into a document or other OLE container. It allows the exported OLE object to be functional as if it still existed in the original application from which it was exported.

PEGRPSVR's only menu options are available through an extended system menu.

Update Client

Selecting this menu option causes the container (document or other OLE container) to be updated with the current image that is displayed in PEGRPSVR. Pressing U will also perform the update.

*Note, if the Resize Capabilities Option is set, then updating the container will change the size of the embedded object to the size of the PEGRPSVR window.

Customization Dialog

Selecting this menu option will invoke the customization dialog for the object. Double-Clicking the object, or Pressing SPACEBAR will also launch the customization dialog.

Export Dialog

Selecting this menu option will invoke the export dialog for the object. Pressing X will also launch the export dialog.

Resize Capabilities

This menu item is an option that can be toggled ON or OFF.

ON - Updating the image will cause the image in the container to be resized to that of the PEGRPSVR window.

OFF - Updating the container image will not effect the original size of the image in the container.

Maximize on Use

This menu item is an option that can be toggled ON or OFF.

ON - PEGRPSVR is invoked to a maximized size.

OFF - PEGRPSVR is invoked to the size of the object being contained.

Average or Mean

The mean of a set of data is equal to the sum of the data divided by the number of items in the data set.

Standard Deviation

The standard deviation is defined as the positive square root of the variance of a data set.

The variance for a data set of n items is equal to the sum of the squared distances from the mean divided by $(n-1)$.

You can think of the standard deviation as the average of all distances of each data point from the mean.

Best Fit Line

The best-fit-line represents how to fit the "best" straight line to a given set of data points. It is calculated from a least-squares-approximations of the data set.

Histogram or Frequency Distribution

The histogram is a graphical representation of the frequency (number of occurrences) of data values within small data ranges (classes) which are created by dividing the total range of data into 5 to 20 equal subintervals.

The most common histogram form is the Bell-Curve. Which is also known as a Normal Distribution.

The histogram is a valuable tool in that it allows you to see how the data values are distributed throughout the range of the data set. Outlier's (the number of data values that are either much smaller or larger than the rest of the data values) are quickly recognized.

Chebyshev's Rule & The Empirical Rule

You can use these rules to determine if a data value should be considered too far from the rest of the normal data values.

Chebyshev's Rule - any shape frequency distribution

- a. It is possible that very few of the data points will fall within 1 standard deviation of the mean.
- b. At least three-fourths of the data points will fall within 2 standard deviations of the mean.
- c. At least eight-ninths of the data points will fall within 3 standard deviations of the mean.

The Empirical Rule - mound shaped frequency distributions

- a. Approximately 68% of the data points will fall within 1 standard deviation of the mean.
- b. Approximately 95% of the data points will fall within 2 standard deviations of the mean.
- c. Essentially all of the data points will fall within 3 standard deviations of the mean.

