

## **The Function Grapher**

version 1.0

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by Bruce M. Terry Jr.

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### **Defining a Function:**

To define a function to be graphed, select "Define Function" from the "Function" menu. A dialog box will appear containing all the various functions and operators on convenient push-button controls. At the top will be the text "f(x) = " with a box for the text entry of the function. The function can be entered either by using the keyboard to type in the function, or using the mouse to press the various push-buttons. Select "OK" to accept the function or "Cancel" to abort. If "OK" is selected, the function will be graphed in the current window.

### **Specifying a Range:**

When the program is first run, the graphing region is limited to all points within the coordinates  $-100 \leq x \leq 100$ ,  $-100 \leq y \leq 100$ . Also, horizontal and vertical grid lines will be drawn every 10 points on the x and y axes. To change this configuration, select "Set Range" from the "Function" menu. A dialog box will appear whereby a different configuration can be entered. To have no grid lines appear, specify a grid size of 0. Once a range has been set, it will be stored in the WIN.INI file and loaded upon the next start of the program.

### **Printing a Graph:**

To print a graph, choose "Print" from the "Graph" menu. A dialog box will appear displaying the currently active printer and prompting for the number of copies to be printed and whether or not the graph is to be scaled to fit the entire page. A graph that is not "Scaled to Page" will be adjusted so that the same proportion of the page is used to print the graph as was used of the screen to draw the graph. A graph that is "Scaled to Page" will use as much of the printed page as possible to display the graph.

### **Setting the Printer Configuration:**

To set the current printer configuration, choose "Printer Setup" from the "Graph" menu. This will bring up the active printer's driver configuration dialog box if this is supported by the current printer driver.

### **Copying the Graph:**

To copy the graph to the clipboard, use the mouse to point to the corner of a rectangular region to be copied and press the left mouse button. Drag it to the opposite corner of the copy region and release the button. A bounding rectangle will be drawn around the copy region. Choose "Copy" from the "Graph" menu to copy the contents of the copy region to the clipboard.

### **Usage Notes:**

1) The "Set Range" option can be used to zoom in on the graphs of functions at various points. Also, by decreasing the grid size, a more exact picture of how the function behaves can be seen. For example, to see how the graph of the function " $f(x) = \sin(x^2)$ " behaves at  $\pi/2$ , specify a range of Maximum X = 1.8, Minimum X = 1.3, Maximum Y = 1, Minimum Y = .4, Horizontal Grid Size = 1.5708, Vertical Grid Size = .05. You will see that it intersects the line " $y = 1.5708$ " in between " $x = .6$ " and " $x = .65$ " (actually, at about .6243). To see an even more detailed picture, shrink the range and vertical grid size. A grid size of .0001 to 99999.9999 is supported.

2) Regardless of whether or not the graph is scaled to fit the page, when the graph is printed, it will use the printer's resolution. For some printers (e.g. laser printers with resolutions around 300 dots per inch, or 2,550 horizontal pixels on a standard page) this resolution can be quite high. If you are going to print graphs on printers with similar resolutions, you should have a minimum of 2 megabytes of extended memory. Printing has been attempted on machines with only 1 megabyte of memory trying to print to a laser printer but no graphs could be printed. The machine appeared to have locked-up; however, after approximately 5 minutes, the program properly reported that printing had failed.

3) If you are running this program in conjunction with one or more other programs running in variously sized windows, don't be alarmed if when you switch to and from other programs, the graphics cursor turns into an hourglass for extended periods of time (around five seconds). This will occur when a portion of the Function Grapher screen can be seen in the background after switching to another program window. What has happened is that the Function Grapher has been called on to

repaint all visible portions of its window. Even though only a small portion may be showing, the program must scan from the left most position of the visible portion to the right most position to see if the current graph extends into any of the visible portion of the window. Therefore, if even a very narrow portion of the window extends horizontally across the screen, each x-coordinate that appears in this portion must be checked. To minimize delay, you can either minimize the Function Grapher before switching to another window, or size the window so that no wide horizontal portions of the window are showing when you switch to another window.