SyMan Lesson 2: Introduction to Graphing With SyMan

One of the most useful features of SyMan is its ability to graph and examine almost any function. The purpose of this exercise is to introduce you to SyMan's basic graphing capabilities.

As you follow along with the example below, be sure to read the explanation after each step. These explanations tell you why you are doing each step, and give further helpful advice.

Step 1 **Type the equation "`y = 3x`" and then press the return key. (Don't type the quotation marks around the equation!)**

As you type, you'll see everything you type appear in the box in the lower left corner of the screen. If you make a typing mistake, you can erase it by pressing the backspace key located at the top right corner of the keyboard.

Step 2 **Pull down the Graph menu to the first option, "Graph Active Equation," and release the mouse button. (Make sure the equation is displayed in the upper-right corner before you tell SyMan to graph it.)**

The "Graph Active Equation" option tells SyMan to graph the equation shown in the upper-right corner of the screen (the active equation window). The only restriction on the equation is that it must always be in "`y = ....`" or "`x = ....`" form.

Step 3 **In the space provided below, sketch the graph that SyMan drew in the graph window.**

Step 4 **Enter the equation "`y = x^2 – 1`" and then, in the space below, show how SyMan displays this equation in the active equation window (the upper-right corner). Note that the "`^`" character is produced by holding down the shift key and pressing the "6" key at the top of the keyboard.**

`y = x^2 – 1` is displayed as: _____

Since there is no easy way to move up half a line to enter an exponent, we have to indicate powers some other way. SyMan interprets the "`^`" (caret) as an exponentiation operator— hence "`x^2`" is understood to mean `x\s(2)`.

Step 5 **Use SyMan to graph the equation you just entered, then sketch the result in the space below:**

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Step 6   **There are two numbers displayed in a box in the top-right corner of the graph — what do you think these numbers represent? (Try moving the mouse pointer around inside the graph)**

The numbers represent _____

Step 7   **The two graphs intersect at a point on the screen below and to the right of the origin— use the mouse crosshair to find the approximate coordinates of this intersection point.**

intersection point is (_____ , _____)

This intersection point is only a rough approximation. A more correct value may be obtained by zooming-in on the point....

Step 8   **To zoom-in on the graph, move the mouse crosshair to a position slightly above and to the left of the intersection, then press and hold the mouse button. With the mouse button still held down, drag the mouse crosshair down and to the right of the intersection. When you have enclosed the intersection point in the outline-box, release the mouse button.**

If you have trouble zooming-in, pull down the Graph menu to "Reset Limits" and try again.

Step 9   **Again, use the mouse crosshair to determine the coordinates of the point of intersection of the two graphs. (If you know how, solve algebraically for the intersection point and compare your answer to the answer you found with SyMan.)**

intersection point is (_____ , _____)

Step 10   **To restore the graphs to the original display, pull down the Graph menu and choose "Reset Limits".**

The "Reset Limits" option sets the limits on the graph back to their original settings of ±5. You can also use "Graph Options" to enter whatever limits you wish, but that requires us you to type in each number.

Step 11   **Pull down the Graph menu and choose the "Zoom Out" menu option.**

The "Zoom Out" option zooms out by a factor of 2, though the center-point of the screen remains fixed.

Step 12   **Notice that the graphs intersect at a second point above and right of the first intersection. Use a combination of "zooming-out" (Step 11) and "zooming-in" (Step 8) to find an accurate measurement of the coordinates of this second point of intersection:**

second intersection point is (_____ , _____)

When you have completed Steps 1 through 12, go on to answer the following questions:

1.)   What will SyMan show in its active equation window when the following equations are
         entered? Check your answer by entering the equations into SyMan.

   a)   `y = x^3`   _____

   b)   `y = 3x^2`   _____

   c)   `y = -x^2 - 7x`   _____

   d)   `y = x^3 - 8x^2 - 3`   _____

   e)   `y = 1/x^2`   _____

   f)   `y = 1/(x^2 - 1)`   _____

2.)   What must you type to enter the following equations? Check your answer by entering it into
         SyMan.

   a)   `y = x\s(5)`   _____

   b)   `y = 5x\s(2)`   _____

   c)   `y = -2x\s(3) + 4x`   _____

   d)   `x = y\s(4) - 8y\s(2) - 3`_____

   e)   `x = \f(1,y\s(5))`   _____

   f)   `x = \f(1,2y\s(2) - 3)`   _____

3.)   How do you zoom in in a graph?

4.)   How do you reset the limits on the graph back to their original values of ±5 ?

5.)   Try using the "Graph Options" menu choice to change the limits on the graph such that the domain in x is from `–10` to `7`, and the range in y is from `–5` to `15`.

6.)   What other options are available from the "Graph Options" dialog box, and what does each of these options do? (Note that you must click on the "OK" button before the new options take effect.)

7.)   Use SyMan to determine the intersection points of the following pairs of functions. Be sure to pull down the Graph menu to the "Clear Graph" option before you graph each new pair of equations.

   a)   `y = x\s(2), y = x+1`   point of intersection is (_____ , _____)

   b)   `y = x\s(3), y = –x+2`   point of intersection is (_____ , _____)

   c)   `x = \f(1,y), x = y`   point of intersection is (_____ , _____)

   d)   `x = y\s(2)–2, x = y\s(3)` point of intersection is (_____ , _____)

   e)   `y = –x\s(2)+3, y = x\s(2)`   first point of intersection is (_____ , _____)

           second point of intersection is (_____ , _____)