

**Multiple Graphs : Part One - "Add Curve Plot"**

Often when you want graphs of two functions you want their graphs to be displayed together. Instead of two Graphic Objects you want one Graphic Object containing two graphs displayed together.

This is the job of the Curve graphic statements inside the Graphic Object.



Here is a graph. Take a look inside the options box. There is one Curve statement and there is one curve graphed.



$$w = x^2 + 1$$



3 ... 3 = left...right

Stretch to Fit ▼

1 ... 10 = bottom...top

cropping Moderately ▼

Graph Building Blocks

Curve at (x, w) where $x =$ left ... right with a

normal ▼ line, colored Black ▼.



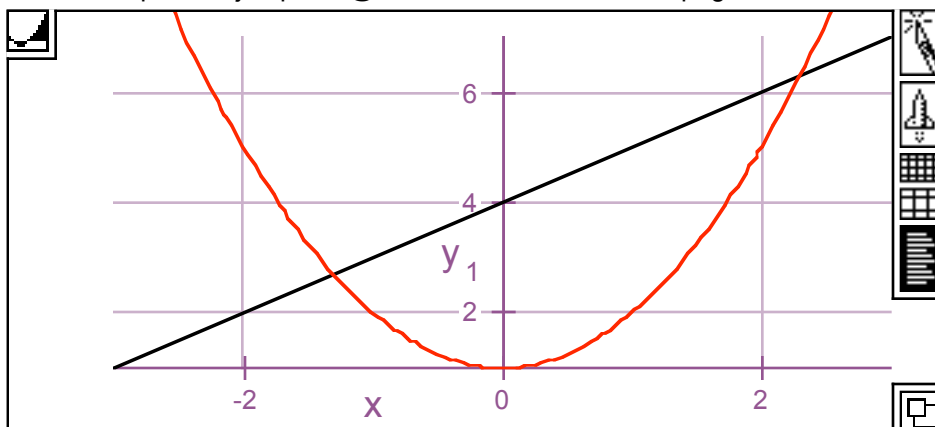
Here is another graph. Take a look inside the options box. There are two Curve statements and there are two graphs in the viewing window.



$$y_1 = x + 4$$



$$y_2 = x^2 + 1$$


 3 ... 3 = left...right

 Stretch to Fit▼

 1 ... 7 = bottom...top

 cropping Moderately▼

Graph Building Blocks

Curve at (x, y_1) where $x =$ left ... right with a normal▼ line, colored Black▼.

Curve at (x, y_2) where $x =$ left ... right with a normal▼ line, colored Red▼.

Take a closer look at the two Curve statements inside the graphic object above. The coordinates are (x, y_1) and (x, y_2) . The first Curve statement is for the curve $y_1 = x + 4$. The second Curve statement is for the curve $y_2 = x^2 + 1$.

The options selected for each of the Curve statements affect each curve individually.

Creating a Graphic Object with two graphs

There are a couple of ways to graph two expressions together.

Here is the first method:

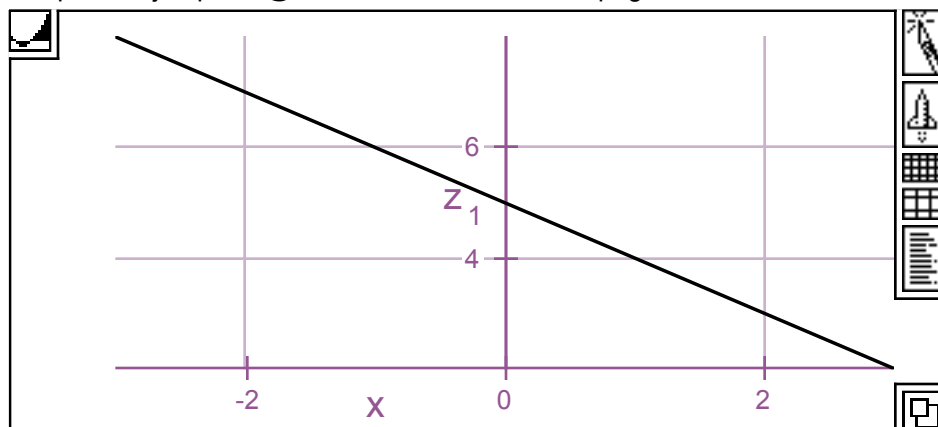
Step 1) Define your two expressions.

$z_2 = \sin(x) + 3$

$z_1 = x + 5$

Step 2) Graph the first one as usual. Click on the equal sign to highlight the whole expression (just the expression not the icon). Then click on the 2D-graph button in the palette.

$z_1 = x + 5$



$z_2 = \sin(x) + 3$




A new graphic object has appeared with the graph of $z_1 = -x + 5$. This graphic object is located directly below the definition of $z_1 = -x + 5$. The definition of $z_1 = -x + 5$ is now the active definition. Its icon has a dot in it.



Step 3) Click on the equal sign of the second expression to highlight the expression.

You don't want to create a new graphic object for this expression...don't click on the 2D -graphing button. Instead you want to add a new graph to a graphic object that already exists in the notebook.

Locate this already existing graphic object. You need to tell LiveMath that you want to add the graph of the highlighted expression to this graphing object. So, highlight the graphing object by clicking on its icon . However, if you just click on the graphic object's icon it will indeed highlight, but you will lose the highlighting of the expression. Instead you need to **SHIFT-CLICK**. Click on the equal sign in the expression to highlight the expression, then hold down the SHIFT key and click on the graphic object's icon. Now both will be highlighted.

You now have two things highlighted in your notebook. The expression to be graphed is highlighted. The graphic object where you want the graph to be added is highlighted.

You are now ready to add this graph to the graphic object. To tell LiveMath to add the graph go to the Graph Menu. In there is a SubMenu title 2D Graph. In the 2D Graph SubMenu select Add Curve Plot.

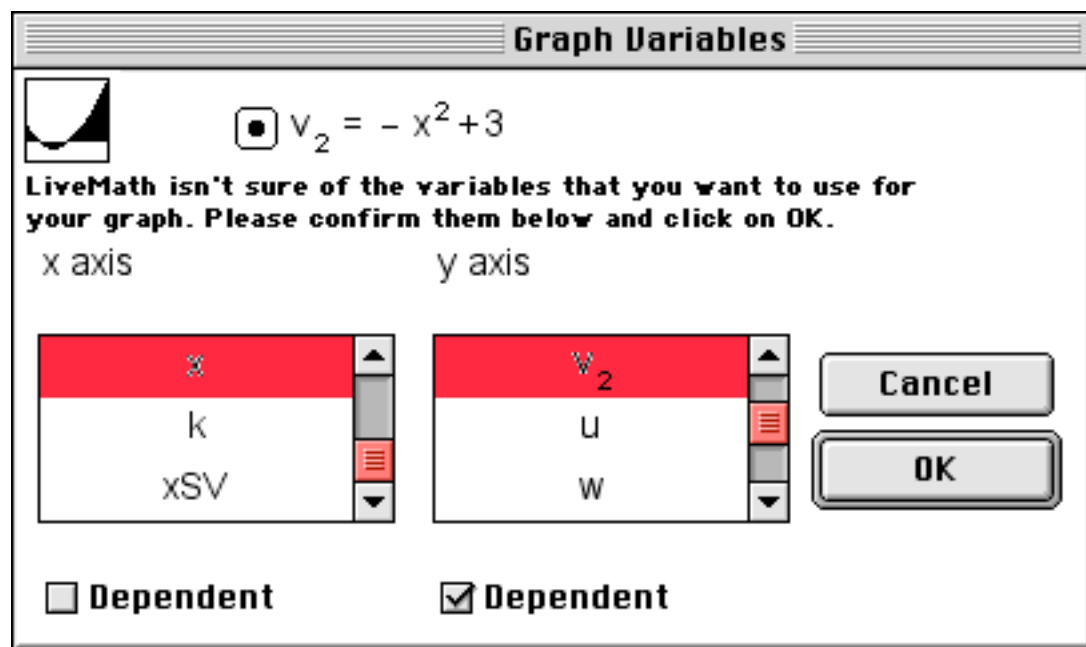
LiveMath will ask you some questions.

Then a second Curve graphic statement will be added inside the select graphic object. A second graph is displayed in the viewing window.


The Questions.

LiveMath will notice that your second expression has a different name than the first expression. The vertical axis is already named with the first expression's name and LiveMath can't find that name in your second expression. LiveMath will double check with you on which variable is for the vertical axis and which variable is for the horizontal axis. It does this with a dialog box that will automatically appear.

In mathematical terms LiveMath wants to know which is the independent variable and which is the dependent variable. In nonmathematical terms LiveMath wants to know which variable is the y-axis and which is the x-axis.



Graph Variables


 $v_2 = -x^2 + 3$

LiveMath isn't sure of the variables that you want to use for your graph. Please confirm them below and click on OK.

x axis y axis

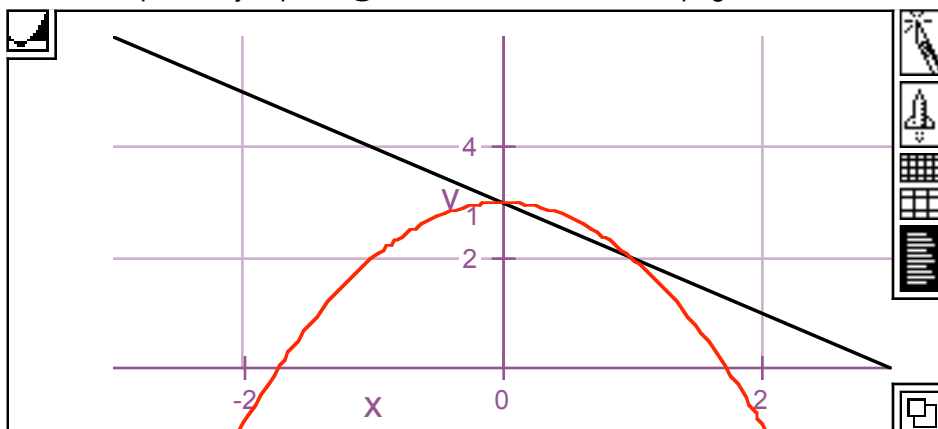
x	v_2	<input type="button" value="Cancel"/> <input type="button" value="OK"/>
k	u	
xSV	w	

Dependent **Dependent**

 LiveMath usually makes good choices and you just click OK. However, look it over and make any changes that you want.

Upon clicking OK, LiveMath will add the second graph to the viewing window and a corresponding Curve statement in the options box.

$v_1 = \square x + 3$


 3 ... 3 = left...right

 Stretch to Fit ▼

 0 ... 6 = bottom...top

 cropping Moderately ▼

Graph Building Blocks

Curve at (x, v_1) where $x =$ left ... right with a

normal ▼ line, colored Black ▼.

Curve at (x, v_2) where $x =$ left ... right with a

normal ▼ line, colored Red ▼.

$v_2 = x^2 + 3$

Take a look at the graphing options in the graphic object above. Two Curve statements each with their own options.

Now It's Your Turn... Follow the directions below to get hands on experience.

Create one graph containing the graphs of the following:

1) $y = x + 1$

heavy thickness

Red

2) $y = \sin(x) + 2$

normal thickness

Blue

viewing window:

x-axis: $[-5, 5]$

y-axis: $[-3, 6]$