LIVEMATH JumpStart Lesson 2 : 2D Graphing

Parametric Plotting :Part Two - Exploring

The 2D graphs we have examined so far have one thing in common. There is an expression in terms of some variable and this expression has a name.

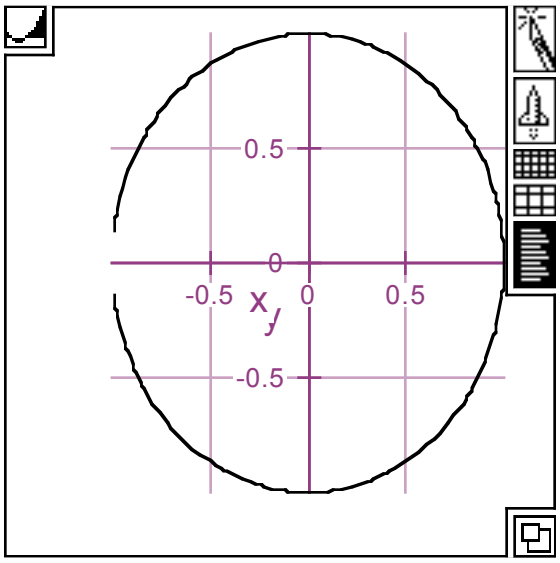
These expressions all have similar graphing Curve statements. The coordinates for the curve plot are of the form (variable, expression name).

These graphs are all formed by having the variable in the first coordinate take on a lot of values. These values are used to calculate the values of the second coordinate via the expression.

We can expand on this type of graphing with Parametric Plot.

The Graping Options box is now open so that we can examine the Curve statement for a parametric curve.

x = cos(t)
y = sin(t)



1 ... 1 = left...right
Stretch to Fit
1 ... 1 = bottom...top cropping
Moderately

Graph Building Blocks
Curve at (x, y) where t = 3 ... 3
with a normal line, colored Black

It looks the same.

There is a curve made of points with coordinates (x, y). The difference here is that both x and y are defined by expressions using t as the variable. The Curve statement recognizes this with

where t = -3...3.

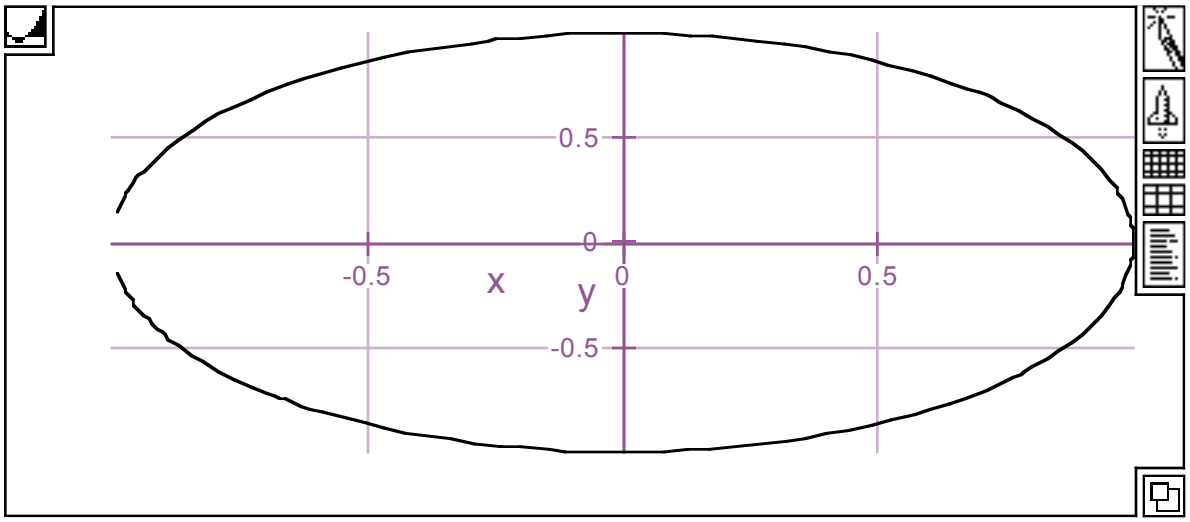
You can change the interval for t by editing these values.

Actually,

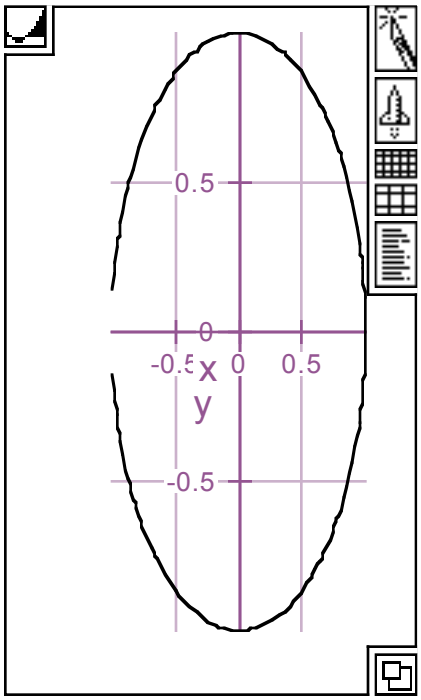
x = cos(t) and y = sin(t)

are the expressions for a circle. Does that look like a circle up there? Sort of...sort of not.

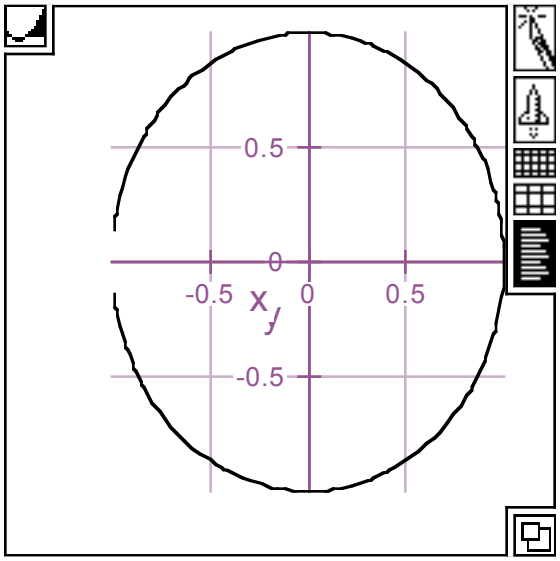
The problem is that LiveMath has choosen different horizontal and vertical display scales. We could grab a hold of the resizing box in the bottom right corner and stretch the display.



Hmmm, not so good. How about



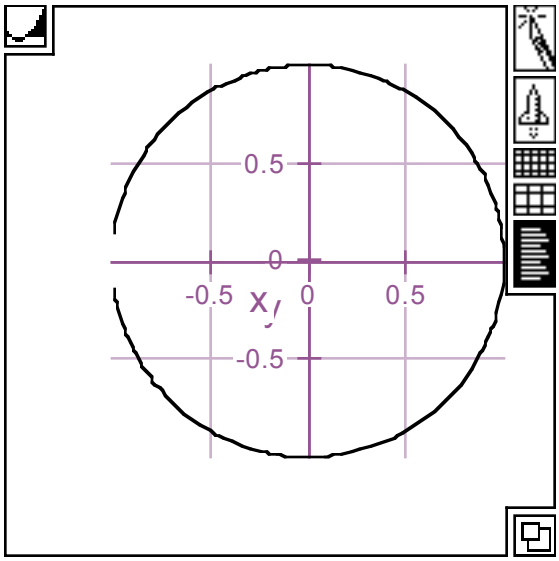
Uh...no. You could stretch it to make it look pretty good, however we can have LiveMath do the stretching us. Take a look in the graphing options box next to (or arround) "left.. .right". Currently, LiveMath is stretching the graph to fit the whole graphing window.



□ 1 ... 1 = left...right
Stretch to Fit
□ 1 ... 1 = bottom...top cropping
Moderately

Graph Building Blocks
Curve at (x, y) where t = □ 3 ... 3
with a normal line, colored Black
.

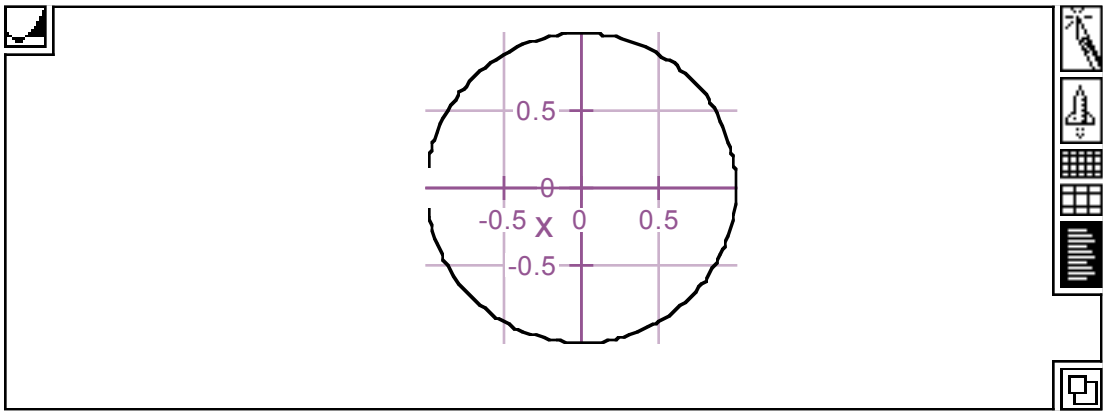
We can change that to True Proportions.



1 ... 1 = left...right
True Proportions
1 ... 1 = bottom...top cropping
Moderately

Graph Building Blocks
Curve at (x, y) where t = 3 ... 3
with a normal line, colored Black

LiveMath now scales everything the same. If you stretch the graphic object, LiveMath will not stretch the graph anymore than the True Proportions will allow.



□ 1 ... 1 = left...right True Proportions

□ 1 ... 1 = bottom...top cropping Moderately

Graph Building Blocks

Curve at (x, y) where t = □ 3 ... 3 with a normal line, colored Black.

This is very handy when viewing conic sections and other graphs where the shape is important.

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

Graph a parametric graph using the following two expressions

x = t cos(t)

y = t sin(t)

where t goes from 0 to 20.

Red

heavy thickness

Make a graph with Stretch to Fit and then make a separate graph with True Proportions.