http://calculator.runiter.com/graphing-calculator/online-graphing-calculator.htm

$y = x^2 - 3x + 2$ is y, explicitly given as a function of x.

$x^2 + y^2 = 1$ is an equation that implicitly gives y as (a) function(s) of x

$y = \sqrt{1-x^2}$

$y = -\sqrt{1-x^2}$

is a way to graph it as two explicit functions.

§14.1 Space Curves
Vector-valued functions.

$\langle x(t), y(t), z(t) \rangle$

What's the domain of

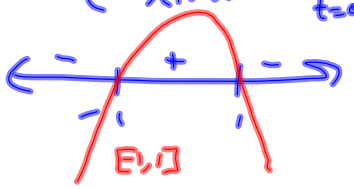
$\vec{v}(t) = \langle \sqrt{1-t^2},\ e^{2t},\ \ln(t+1) \rangle$?

Its graph is a space curve

Need $1-t^2 \geq 0$ AND $t+1 > 0$

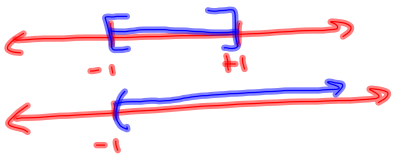
$(1-t)(1+t) \geq 0$ AND $t > -1$

$t=0$: $(1)(1) = 1 > 0$



AND $(-1, \infty)$

$[-1,1] \cap (-1,\infty) = (-1,1]$



Take the overlap.

$(-1, 1]$

limits of vector-valued functions.

$$\lim_{t\to c} \langle x(t), y(t), z(t) \rangle = \langle \lim_{t\to c} x(t), \lim_{t\to c} y(t), \lim_{t\to c} z(t) \rangle$$

$$\lim_{t\to 0^+} \langle \cos(t), \sin(t), t\ln(t) \rangle$$

$$= \langle 1, 0, 0 \rangle$$

$$\lim_{t\to 0^+} t\ln(t) \quad 0\cdot(-\infty) = \lim_{t\to 0^+} \frac{\ln(t)}{\frac{1}{t}} \overset{\text{L'H}}{=} \lim_{t\to 0^+} \frac{\frac{1}{t}}{-\frac{1}{t^2}} =$$

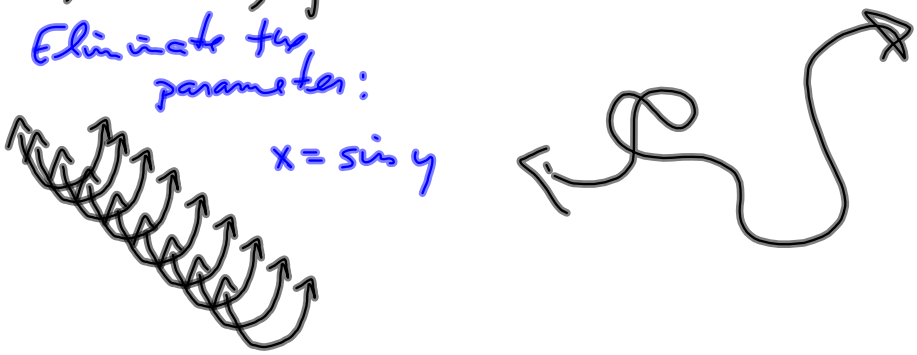
$$= \lim_{t\to 0^+} \left(\frac{1}{t} \cdot \frac{-t^2}{1}\right) = \lim_{t\to 0^+} (-t) = -0 \quad \left(\frac{-\infty}{\infty}\right)$$

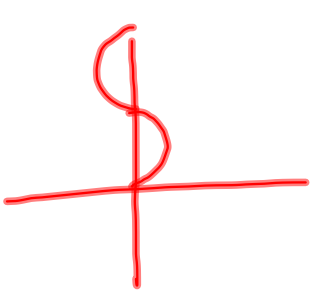
Graph:

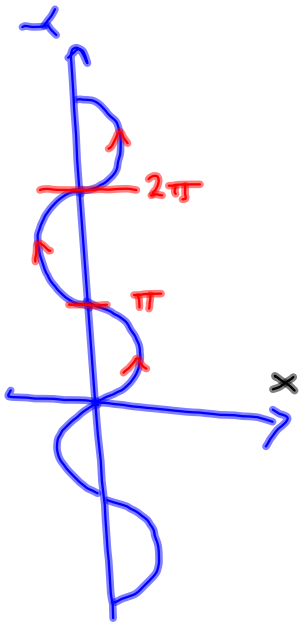
$x = \sin t$, $y = t$

Eliminate the parameter:

$x = \sin y$

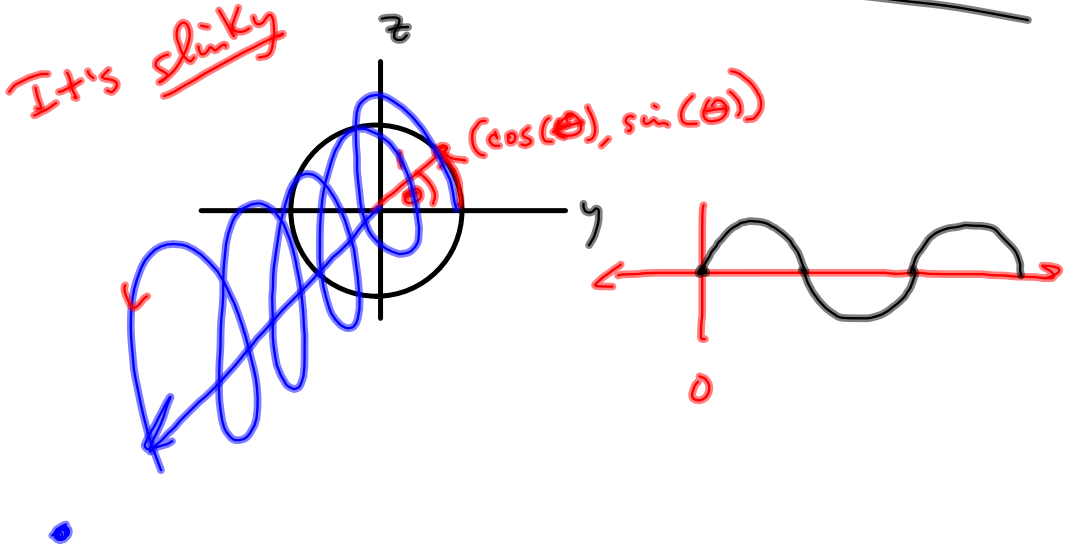






$x = t,\ y = \cos(2t),\ z = \sin(2t)$

$x = x,\ y = \cos(2x),\ z = \sin(2x)$ $\Big\}\ y^2 + z^2 = \cos^2(2x) + \sin^2(2x) = 1$



$x = t^2,\ y = t,\ z = 2$

Its graph's $x = y^2$ in the plane $z = 2$