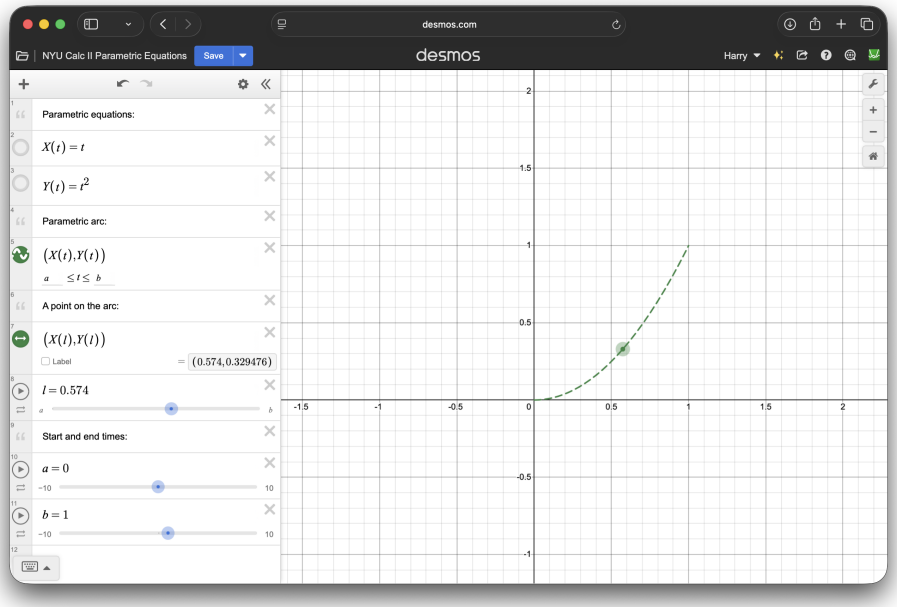
Calc II Parametric Equations

Harry Stoltz



Happy thanksgiving! (Almost)

This week we learned all about parametric equations. One of the best ways to understand these functions is to play around with them. We'll use Desmos for this, but any interactive graphing tool will work. (you could even try using python if you're up for the challenge). The key here is to get your hands dirty & gain an intuition for how parametrization works.

Click Here For The Demo

The toolbox

Before we build anything & start to tinker, it's important to understand what our "toolbox" is. (Don't be afraid to add more tools by the way, but

try to appreciate both the range & limits of these ones)

Parametric functions

$X(t)$ & $Y(t)$

these two equations depend on the same variable t. This is where you will have the most creative freedom. Try plugging in strange functions like sine, cosine, exp,...

note: be sure to capitalize "X" & "Y", since desmos treats "x" & "y" as special characters.

Parametric graph

$(X(t), Y(t)),\ a \leq t \leq b$

this is what is actually plotted on your screen. "a" & "b" are our start & end "times", & we are letting t range across every value inbetween. Try changing a & b, and see how the graph reacts.

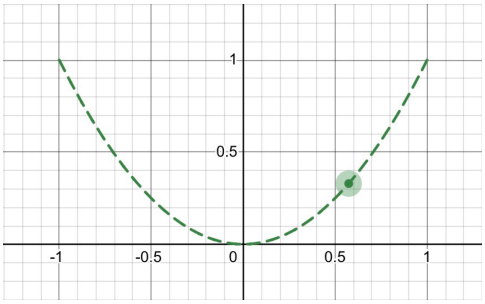
Parametric point

$(X(p), Y(p)),\ fixed\ a \leq p \leq b$

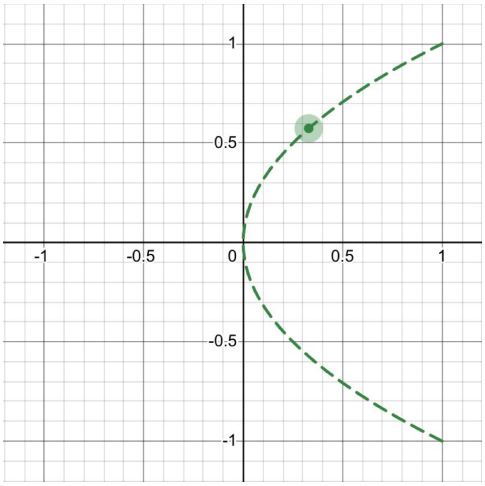
Now, here's one of our points on the graph, at some time p. It only depends on p, so try to move it by dragging th p slider! Desmos will also usually let you drag the point along it's path.

Exercises

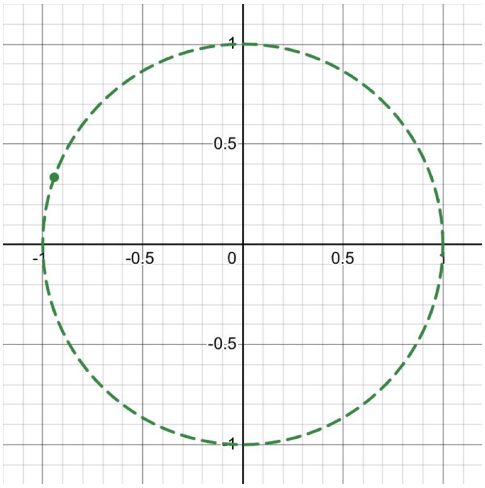
1) Now that we understand our tools, let's try and use them. I have already graphed part of a parabola to the right of the y-axis. Can you extend it to the left?



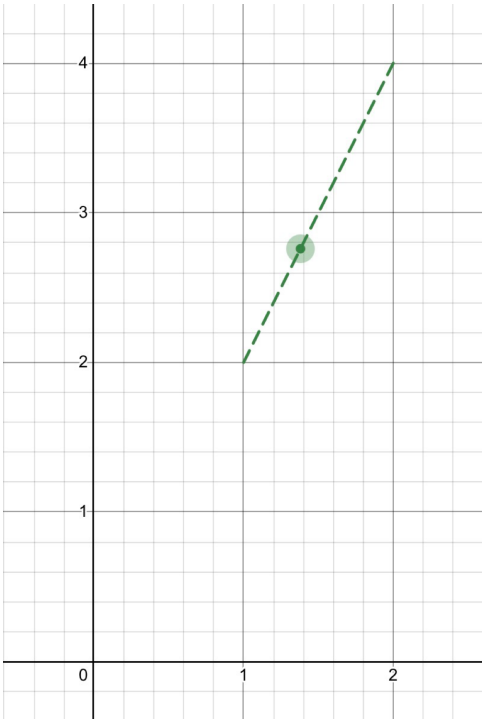
2) Try graphing a sideways parabola:



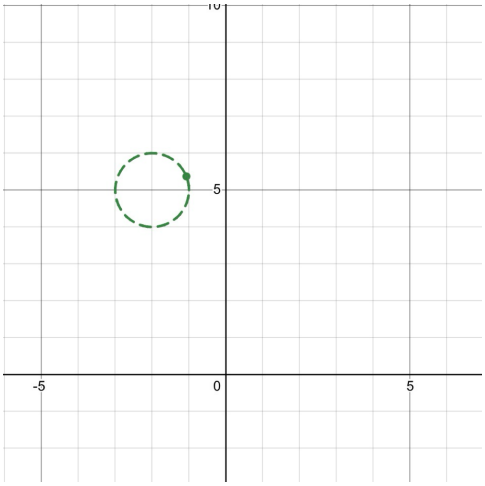
3) Make a circle



4) Make a line between points (1,2) and (2,4)



5) Make a circle of radius 1 centered at (-2,5)



6) Make something fun.

Happy Thanksgiving!