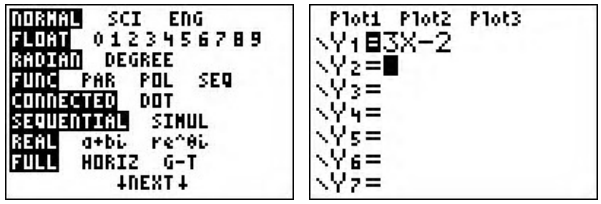
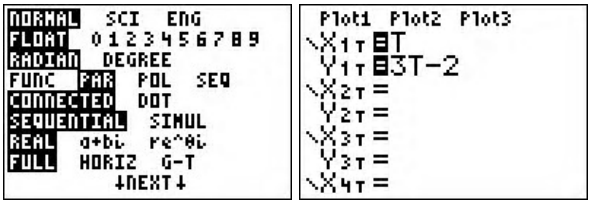
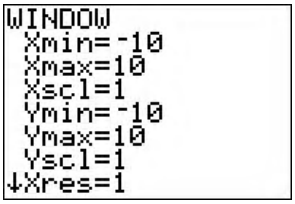
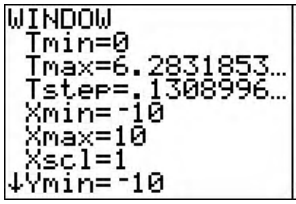
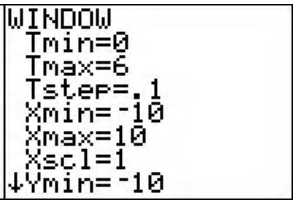
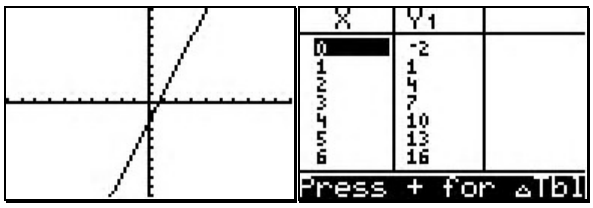
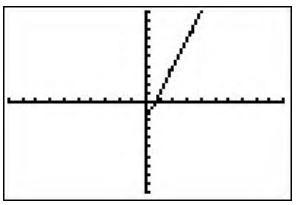
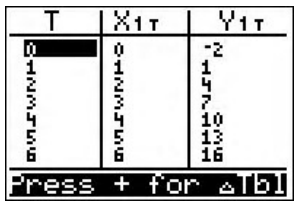
PreCalculus Class Notes VP4 Graphing Parametric Curves

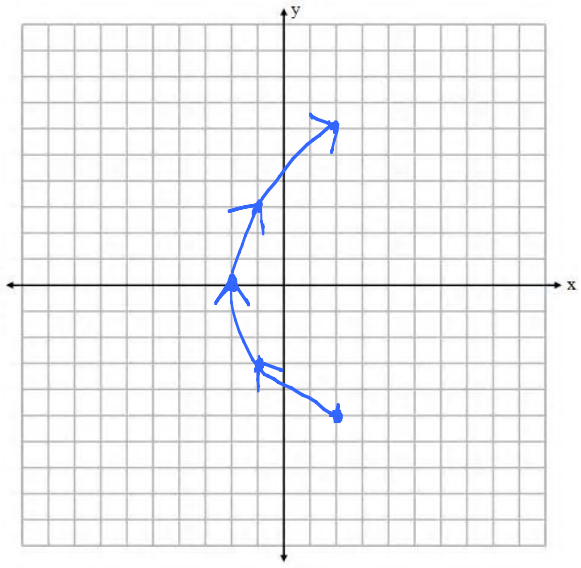
Rectangular equation	Parametric equation
$y = 3x - 2$	$x(t) = t$ $y(t) = 3t - 2$
	
	 
	 

Graph by hand

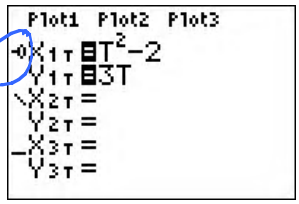
$x = t^2 - 2$

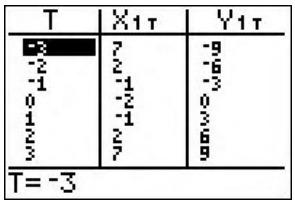
$y = 3t$

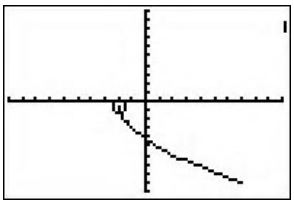
t	x	y
–2	2	-6
–1	-1	-3
0	-2	0
1	-1	3
2	2	6

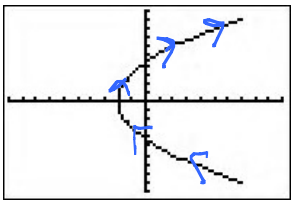


Then on calculator









window t_{min} t_{max}

Converting Equations

From rectangular to parametric—easy!

$y = 3x^2 + \sqrt{x}$	$x = y^3$
$x = t$ $y = 3t^2 + \sqrt{t}$	$x = t^3$ $y = t$

$x = y^3 \rightarrow y = \sqrt[3]{x}$

$x = t$

$y = \sqrt[3]{t}$

From parametric to rectangular—solve x equation for t, then substitute into y equation

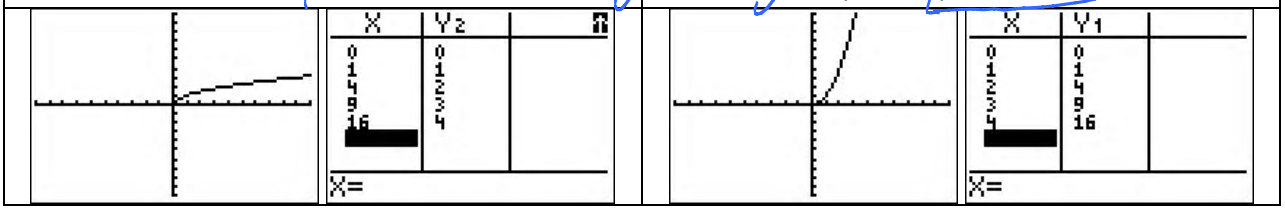
$x = t^2 - 2$ $y = 3t$	$x = t - 3$ $y = \sqrt{t}$
$x = t^2 - 2$ $x + 2 = t^2$ $\sqrt{x+2} = t$ $y = 3t \rightarrow y = 3\sqrt{x+2}$	$x = t - 3$ $x + 3 = t$ $y = \sqrt{t} \rightarrow y = \sqrt{x+3}$

equivalent

Graphing Inverses

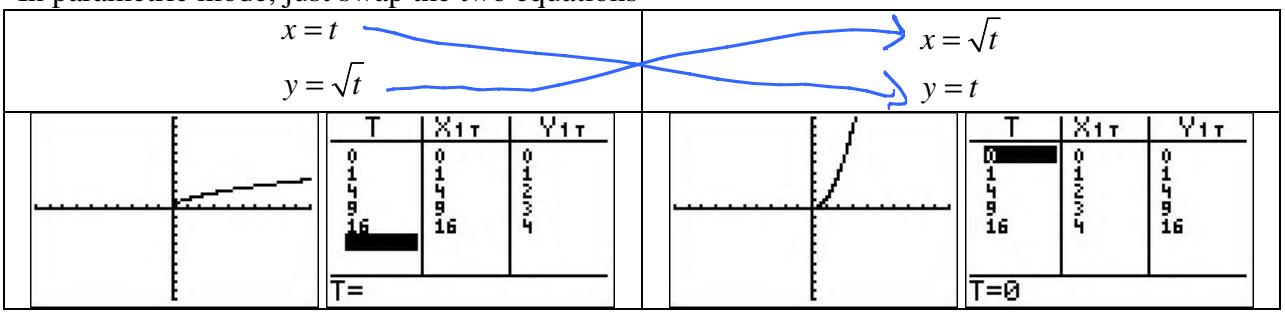
In rectangular form, switch x and y, solve for y. Convert domain restrictions to range and then to domain of the inverse.

$y = \sqrt{x}\,, x \geq 0, y \geq 0$ $\quad x = \sqrt{y} \rightarrow x^2 = y$ $\quad$ Find its inverse $\quad y = x^2\,, y \geq 0, x \geq 0$ $\quad$ QI only



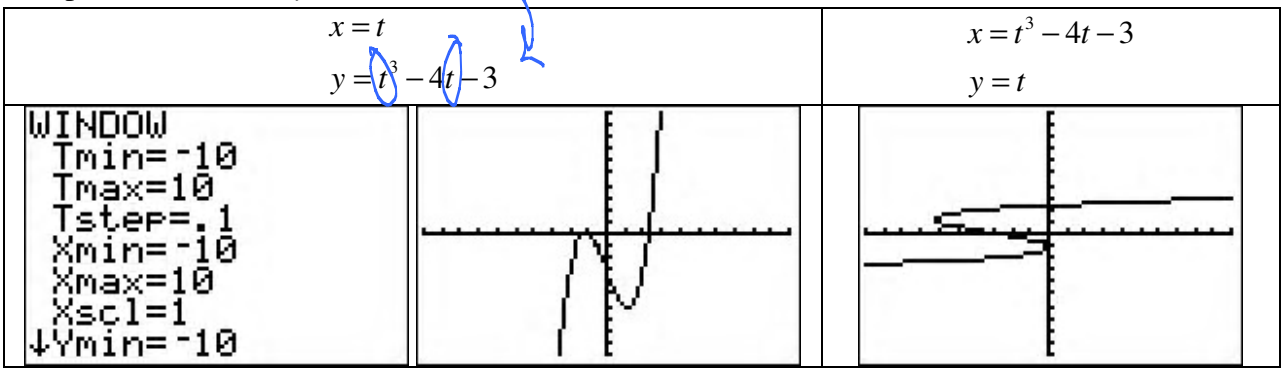
In parametric mode, just swap the two equations

$x = t$, $y = \sqrt{t}$ $\quad\rightarrow\quad$ $x = \sqrt{t}$, $y = t$



Graph the inverse of $y = x^3 - 4x - 3$

$x = t$, $y = t^3 - 4t - 3$ $\quad\rightarrow\quad$ $x = t^3 - 4t - 3$, $y = t$



Radian mode before Zoom Standard

Zoom Square is best for seeing $y = x$ Symmetry