

PreCalculus Class Notes VP4 Graphing Parametric Curves

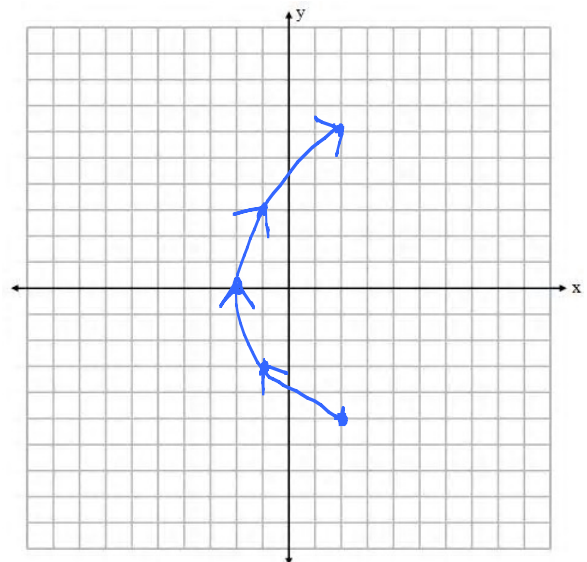
Rectangular equation	Parametric equation																																								
$y = 3x - 2$	$x(t) = t$ $y(t) = 3t - 2$																																								
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Graph by hand

$x = t^2 - 2$

$y = 3t$

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

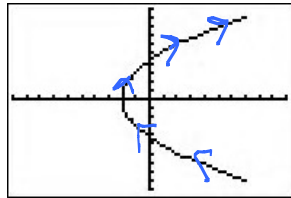
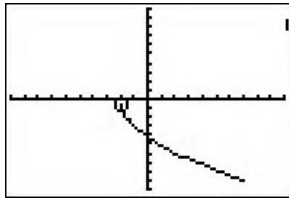


0

Then on calculator

Plot1	Plot2	Plot3
$X_1T = T^2 - 2$		
$Y_1T = 3T$		
$X_2T =$		
$Y_2T =$		
$X_3T =$		
$Y_3T =$		

T	X1T	Y1T
min	min	min
max	max	max
T=-3		



Window t_{min} t_{max}

Converting Equations

From rectangular to parametric—easy!

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

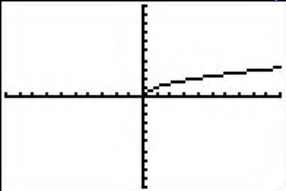
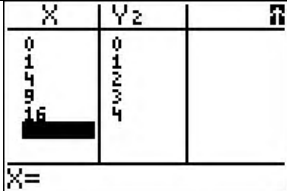
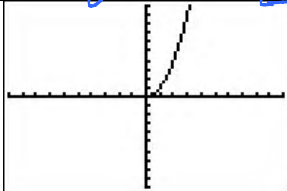
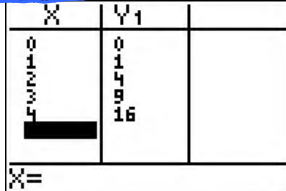
From parametric to rectangular—solve x equation for t, then substitute into y equation

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

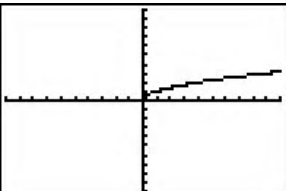
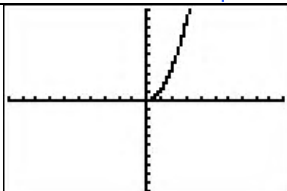
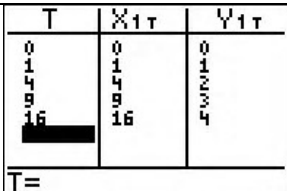
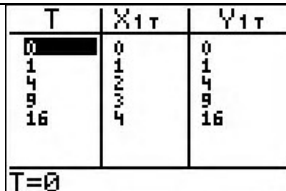
equivalent

Graphing Inverses

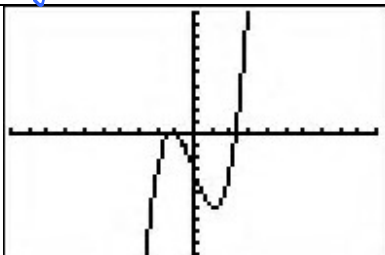
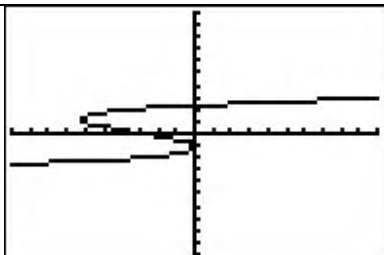
In rectangular form, switch x and y , solve for y . Convert domain restrictions to range and then to domain of the inverse.

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

In parametric mode, just swap the two equations

$x = t$	$x = \sqrt{t}$
$y = \sqrt{t}$	$y = t$
	
	

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

$x = t$	$x = t^3 - 4t - 3$	$x = t^3 - 4t - 3$	$y = t$
$y = t^3 - 4t - 3$			
<pre> WINDOW Tmin=-10 Tmax=10 Tstep=.1 Xmin=-10 Xmax=10 Xscl=1 ↓Ymin=-10 </pre>			

Radius mode
before
Zoom Standard

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