Parametric Equations

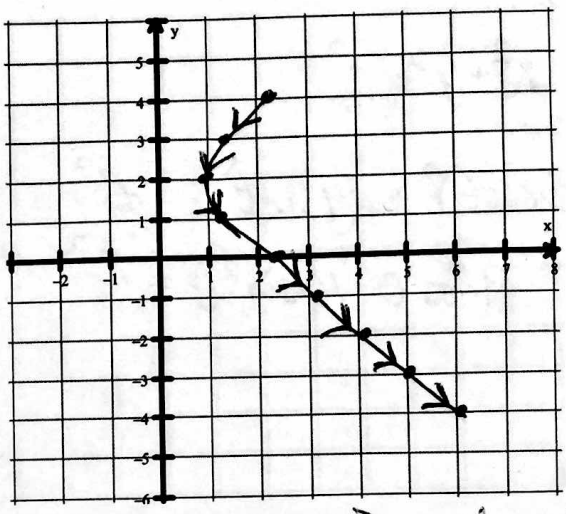
Name _____

1. Fill in the table and sketch the parametric equation for t [-2,6]

$x = \sqrt{t^2 + 1}$

$y = 2 - t$

t	x	y
-2	$\sqrt{5}$	4
-1	$\sqrt{2}$	3
0	1	2
1	$\sqrt{2}$	1
2	$\sqrt{5}$	0
3	$\sqrt{10}$	-1
4	$\sqrt{17}$	-2
5	$\sqrt{26}$	-3
6	$\sqrt{37}$	-4



Remember Direction!

Problems 2 - 6: Eliminate the parameter to write the parametric equations as a rectangular equation.

2. $x = 6 - t$
$y = \sqrt{3t - 4}$

$t = 6 - x \quad y = \sqrt{3(6-x)-4}$

$y = \sqrt{18 - 3x - 4}$

$y = \sqrt{14 - 3x}$

3. $x = \frac{1}{2}t + 4$
$y = t^3$

$t = 2(x-4)$

$y = (2x-8)^3$

4. $x = 3\cos t$
$y = 3\sin t$

$\cos t = \frac{x}{3} \quad \sin t = \frac{y}{3}$

$\left(\frac{x}{3}\right)^2 + \left(\frac{y}{3}\right)^2 = 1$

$\frac{x^2}{9} + \frac{y^2}{9} = 1 \Rightarrow x^2 + y^2 = 9$

5. $x = \cos t$
$y = 2\sin^2 t$

$\cos t = x \quad \sin^2 t = \frac{y}{2}$

$x^2 + \frac{y}{2} = 1$

$y = 2(1 - x^2)$

$y = 2 - 2x^2$

6. $x = 4 + 2\cos t$
$y = -1 + 4\sin t$

$\cos t = \frac{x-4}{2} \quad \sin t = \frac{y+1}{4}$

$\left(\frac{x-4}{2}\right)^2 + \left(\frac{y+1}{4}\right)^2 = 1$

$\frac{(x-4)^2}{4} + \frac{(y+1)^2}{16} = 1$

Problems 7 and 8: Write two new sets of parametric equations for the following rectangular equations.

7. $y = (x + 2)^3 - 4$

$x = t$
$y = (t+2)^3 - 4$

$x = t - 1$
$y = (t+1)^3 - 4$

8. $x = \sqrt{y^2 - 3}$

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

$y = t + 1$
$x = \sqrt{(t+1)^2 - 3}$