11.5 Parametric Basics

THURSDAY: Polar Online Quiz due 9AM

In class: Polar Project Due (beginning of class) Parametrics Quiz (non-calculator)

Warm-Up Tuesday

Graph the following parametric equation on the given interval.

$$x = -\sin t$$
$$y = \cos t$$
$$0 \le t \le \pi$$

About Me

1. What are you most afraid of?
2. What's your most irrational fear?

11.5 Parametric Basics

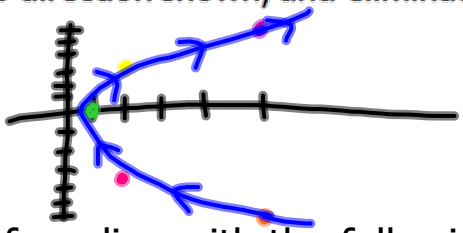
Essential Question: How do I graph an equation in parametric form and eliminate the parameter?

Try it!

Graph the following equations, with the direction shown, and eliminate the parameter.

1. $x = t^2 + 1$
   $y = 3t$

t	x	y
-2	5	-6
-1	2	-3
0	1	0
1	2	3
2	5	6



$\sqrt{x-1} = \pm t^2$

$t = \pm\sqrt{x-1}$

$y = 3(\pm\sqrt{x+1})$

$y = \pm 3\sqrt{x+1}$

Find the parametric equation for a line with the following properties.

2. A line that goes through (-6,2) and (-1,-2).

$x_1\ y_1 \quad x_2\ y_2$

$m = \frac{-2-2}{-1-6} = \frac{-4}{5}$

↓4
→5

$x = 5t - 1$
$y = -4t - 2$

OR

$x = 5t - 6$
$y = -4t + 2$

etc ☺

11.5 Parametric Basics

Essential Question:

How do I graph an equation in parametric form and eliminate the parameter?

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Parametric Equation:

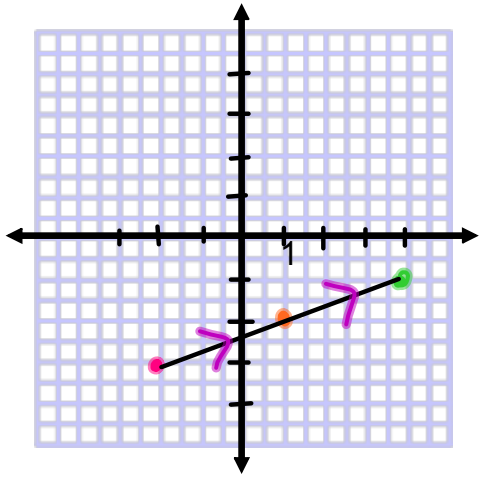
The coordinates of points are a function of a parameter, called t.

$$x = 3t + 1$$
$$y = t - 2 \qquad -1 \le t \le 1$$

a. Graph the parametric equation.

direction

t	x	y
-1	-2	-3
0	1	-2
1	4	-1



b. Eliminate the parameter (Get rid of t)

- Solve for t in one equation

$y = t - 2$
$+2 \quad +2$
$y + 2 = t$

$x = 3(y+2) + 1$
$x = 3y + 6 + 1$
$x = 3y + 7$
$-7 \quad -7$

$\frac{x-7}{3} = \frac{3y}{3}$

$y = \frac{1}{3}x - \frac{7}{3}$

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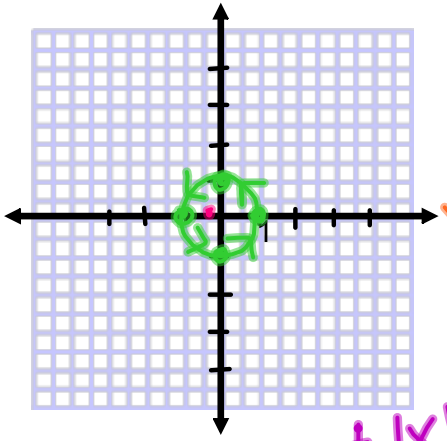
Essential Question: How do I graph an equation in parametric form and eliminate the parameter?

Graph the following equations, with the direction shown, and eliminate the parameter.

1. $x = \cos t$, $y = \sin t$

t	x	y
0	1	0
$\pi/2$	0	1
π	-1	0
$3\pi/2$	0	-1



$x^2 = \cos^2 t$

$y^2 = \sin^2 t$

$x^2 + y^2 = \cos^2 t + \sin^2 t$

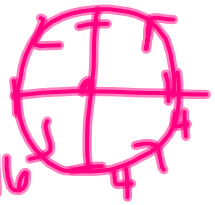
$x^2 + y^2 = 1$

2. $x = 4\cos t$, $y = 4\sin t$

circle

$r = 4$

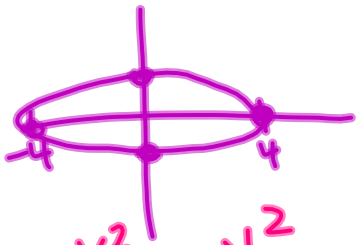
$x^2 + y^2 = 16$



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

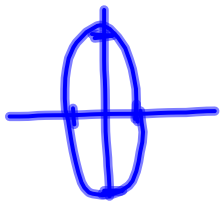
#3

t	x	y
0	4	0
$\pi/2$	0	1
π	-4	0
$3\pi/2$	0	-1



$\frac{x^2}{16} + \frac{y^2}{1} = 1$

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

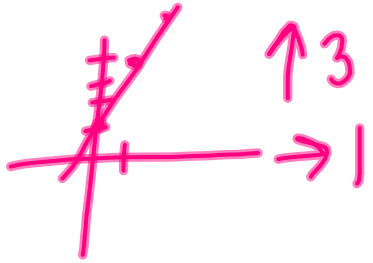


11.5 Parametric Basics

Essential Question: How do I graph an equation in parametric form and eliminate the parameter?

Find the parametric equation for a line with the following properties.

5. A line with a slope of 3 and goes through the point (1,4).



T

$t = 0$

$x = t + 1$

$y = 3t + 4$

11.5 Parametric Basics

Essential Question: How do I graph an equation in parametric form and eliminate the parameter?

Try it!

Graph the following equations, with the direction shown, and eliminate the parameter.

1. $x = t^2 + 1$
   $y = 3t$

Find the parametric equation for a line with the following properties.

2. A line that goes through (-6,2) and (-1,-2).

Name:_____

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1–22 ■ A pair of parametric equations is given.

(a) Sketch the curve represented by the parametric equations.

(b) Find a rectangular-coordinate equation for the curve by eliminating the parameter.

1. $x = 2t, \quad y = t + 6$

3. $x = t^2, \quad y = t - 2, \quad 2 \le t \le 4$

5. $x = \sqrt{t}, \quad y = 1 - t$

7. $x = \dfrac{1}{t}, \quad y = t + 1$

9. $x = 4t^2, \quad y = 8t^3$

11. $x = 2 \sin t, \quad y = 2 \cos t, \quad 0 \le t \le \pi$

16. $x = \cos 2t, \quad y = \sin 2t$

23–26 ■ Find parametric equations for the line with the given properties.

23. Slope $\frac{1}{2}$, passing through $(4, -1)$

25. Passing through $(6, 7)$ and $(7, 8)$