Polar Coordinates and graphing of polar equations due Tomorrow. (3 Assignments)

Dec 19-1:21 PM

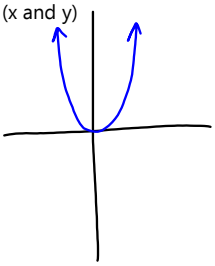
9.5: Parametric Equations

Before...

"rectangular equations"

equations that only describe position (x and y)

$y = x^2$



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Now...

"parametric equations"

equations that describe position (x and y) AND time (t)

$x = t$

$y = t^2$

Parametric Equations introduce a 3rd variable or parameter.

Parametric equations are useful in modeling curvilinear motion which describes the path of an object in terms of space (position) and time.

Dec 19-2:46 PM

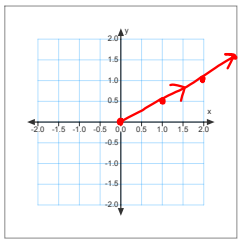
Orientation of a curve results from plotting (x,y) points based on increasing values of t.

Ex. Define the path of the object and describe orientation given parametric equations:

→ x=t

⇛ y=½t

t	0	1	2	3
x	0	1	2	3
y	0	½	1	1½



Dec 19-9:47 AM

How to Eliminate the Parameter t

p. 705, #11 (HW)

We eliminate the parameter to identify the object's path or curve.

① Solve for t.

② Plug in t = ...

Ex. Sketch the curve by eliminating the parameter.

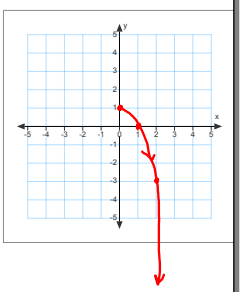
$x = \sqrt{t}$

$y = 1 - t$

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

$x^2 = t$

$y = 1 - x^2$



Confirm with calc:
Nspire - Menu/Graph Type/Parametric
TI-84 - Mode/PAR

Dec 19-10:10 AM

How to Eliminate the Parameter θ (angle)

Useful for modeling circular movement.

① Solve for cosθ and/or sinθ

② Plug into $\cos^2\theta + \sin^2\theta = 1$

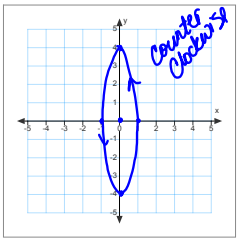
$x^2 + \left(\frac{y}{4}\right)^2 = 1$

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

Ex. Sketch the curve by eliminating the parameter.
What do we call this shape?

$x = \cos\theta$ $\cos\theta = x$

$\frac{y}{4} = \frac{4\sin\theta}{4}$ $\sin\theta = \frac{y}{4}$



Confirm with calc:
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TI-84 - Mode/PAR

plot where $0 \le \theta \le 2\pi$
(default in calculator)

Dec 19-10:10 AM

HOMEWORK

parrrrrrrrrrrrrrrrameters!
Get ready for Bug Races on Monday!!!!

9.5 (p. 705): 1-5 (odd), 11-21 (odd), 22, 36, 49, 66

Dec 19-3:09 PM

Just a reminder of CONIC SECTIONS...

Jan 6-8:52 PM