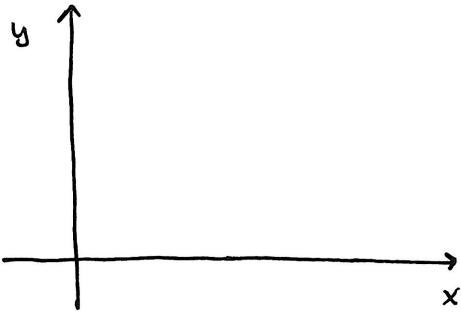


Section 10.1 - Parametric Equations

MVC

Not all curves in the xy -plane can be written as a function of x or as a function of y - Example is a circle.



A bigger collection of curves, other than functions, where points are functions of a variable called a parameter.

Parametric Equations:

Parametric Curve:

Example 1 Sketch and Identify the curve defined by $x = t^2 - 2t$, $y = t + 1$.

Example 2 What curve is represented by the following parametric equations $x = \cos t$, $y = \sin t$, $0 \leq t \leq 2\pi$?

Example 4 Find parametric equations for the circle of radius r and center (h, k) .

Example 6 Use your graphing calculator to graph $x = y^4 - 3y^2$

Section 10.1 - Parametric Equations

MVC

• Sketch on your graphing Calculator

① $x = 5 \sin t - \sin 2.3t$

$y = \cos t$

$0 \leq t \leq 70$

② $x = 16 \sin^3 t$

$y = 13 \cos t - 5 \cos(2t) - 2 \cos(3t) - \cos(4t)$

[Use TI-84 Emulator or Wolfram Alpha for graphs]

Extra Examples

#13 (a) Eliminate the parameter (b) sketch the curve

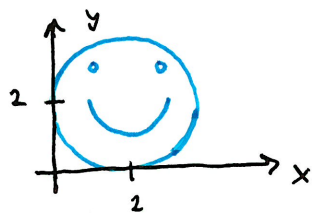
$x = \sin t$ $y = \csc t$ $0 < t < \pi/2$

#21 Describe the motion of a particle with position (x, y) :

$x = 5 \sin t$ $y = 2 \cos t$ $-\pi \leq t \leq 5\pi$

#31(a) Show $x = x_1 + (x_2 - x_1)t$ $y = y_1 + (y_2 - y_1)t$ where $0 \leq t \leq 1$ describes the line segment between (x_1, y_1) and (x_2, y_2) .

#35 Use a graphing calculator to reproduce the graph



#33(c) Find parametric equations that travel halfway counterclockwise around $x^2 + (y-1)^2 = 4$ starting at $(0, 3)$.