Sketching parametric curves by plotting points

To sketch a parametric curve, we'll follow these steps:

1. Create a table where we find x- and y-values based on specific parameter values of t.
2. Eliminate the parameter to find a cartesian equation in terms of just x and y.
3. Sketch the parametric curve.

Let's walk through an example, so we can see these steps in action

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Example

Sketch the parametric curve.

$$y = \sin t$$

$$x = \cos t$$

$$0 \leq t \leq 2\pi$$

Let's create a table of x- and y-values based on parameter values of t inside the given interval. Since the interval is given as $0 \leq t \leq 2\pi$, we'll choose well-known parameter values inside this interval so that they're easy to plug into our equations for x and y.

	x	y
$t_1 = 0$	1	0
$t_2 = \frac{\pi}{2}$	0	1
$t_3 = \pi$	-1	0
$t_4 = \frac{3\pi}{2}$	0	-1
$t_5 = 2\pi$	1	0

Now we'll eliminate the parameter to find a cartesian equation that represents our parametric equation. If we remember that $\sin^2 t + \cos^2 t = 1$, we can just square our parametric equations,

$$y = \sin t$$

$$y^2 = \sin^2 t$$

and

$$x = \cos t$$

$$x^2 = \cos^2 t$$

and then plug them into the identity.

$$\sin^2 t + \cos^2 t = 1$$

$$y^2 + x^2 = 1$$

$$x^2 + y^2 = 1$$

Since we have a list of points to plot and we know our cartesian equation, we can sketch the parametric curve. When we plot the points following the direction of the parameter t, we'll see that the parameter is moving counter-clockwise around the circle.