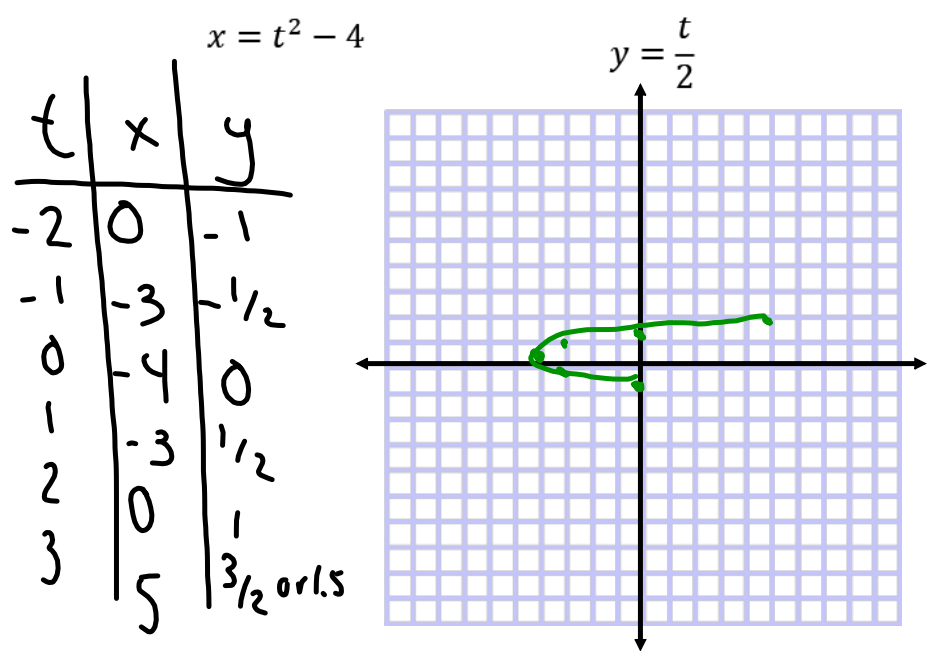


Parametric Equations

Sketching a Plane Curve

parameter

$$-2 \leq t \leq 3$$



Graphing Parametric Equations in a Calculator

a. $x = t^2, y = t^3$

b. $x = t, y = t^3$

c. $x = t^2, y = t$

Eliminating the Parameter

$$x = t^2 - 4$$

$$y = \frac{1}{2}t$$

$$x = (2y)^2 - 4$$

$$2 \cdot y = \frac{1}{2}t \cdot 2$$

$$x = 4y^2 - 4$$

$$2y = t$$

$$\frac{x+4}{4} = \frac{4y^2}{4}$$

$$\sqrt{\frac{x+4}{4}} = \sqrt{y^2} \Rightarrow y = \frac{\sqrt{x+4}}{2}$$

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

$$(t+1) \cdot x^2 = \frac{1}{t+1} \cdot (t+1)$$

$$\frac{x^2(t+1)}{x^2} = \frac{1}{x^2}$$

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

$$t = \frac{1}{x^2} - 1$$

$$y = 1 - x^2$$

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

Sketch by eliminating the parameter

$$x = 3 \cos \theta$$

$$y = 4 \sin \theta$$

$$0 \leq \theta \leq 2\pi$$

$$x^2 = (3 \cos \theta)^2$$

$$y^2 = (4 \sin \theta)^2$$

$$\frac{x^2}{9} = \frac{9 \cos^2 \theta}{9}$$

$$\frac{y^2}{16} = \frac{16 \sin^2 \theta}{16}$$

$$\frac{x^2}{9} = \cos^2 \theta$$

$$\frac{y^2}{16} = \sin^2 \theta$$

$$\frac{x^2}{9} + \frac{y^2}{16} = \cos^2 \theta + \sin^2 \theta$$

$$\frac{x^2}{9} + \frac{y^2}{16} = 1$$

Finding Parametric Equations

Find a set of parametric equations to represent the graph of $y = 1 - x^2$

$$y = 1 - x^2$$

$$x = t$$

$$y = 1 - t^2$$

