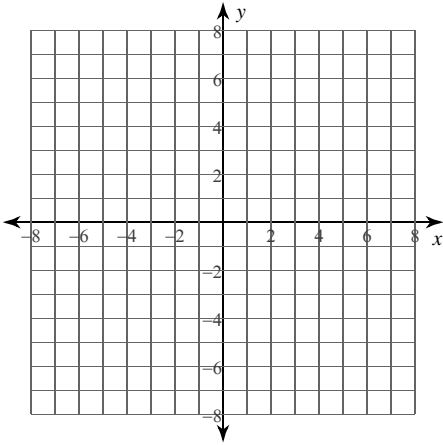


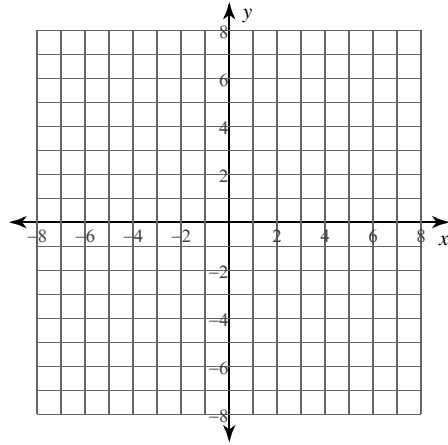
## Parametric Equations

Sketch the curve for each pair of parametric equations.

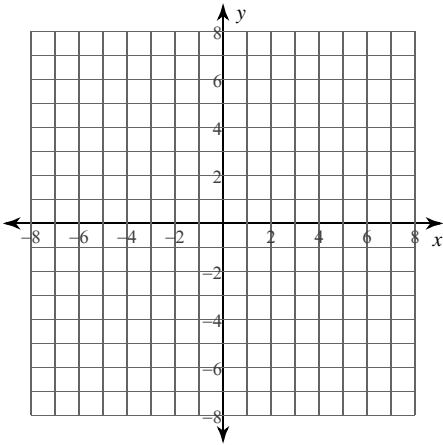
1)  $x = t, y = \frac{t^2}{4}$



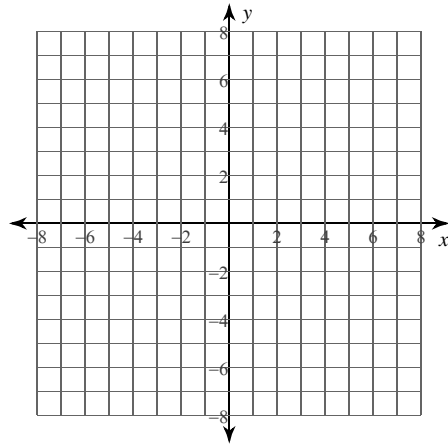
2)  $x = -2t + 2, y = \frac{4t^2}{5} - 2, -2 \leq t \leq 3$



3)  $x = 5\sin t, y = 4\cos t$



4)  $x = 2\sec t, y = 4\tan t$



Write each pair of parametric equations in rectangular form.

5)  $x = -\frac{t^2}{3}, y = t$

6)  $x = t, y = \frac{t^2}{6} + \frac{2t}{3} - \frac{1}{3}$

7)  $x = -2t - 3, y = 2t^2 + 2t - \frac{5}{2}$

8)  $x = 2\sin t, y = 4\cos t$

9)  $x = \sec t, y = 4\tan t$

10)  $x = 4\cos t - 1, y = 3\sin t + 1$

Use the parameter to write each rectangular equation as a pair of parametric equations.

11)  $x = \frac{y^2}{6}, t = y$

12)  $y = -\frac{x^2}{4} + x + 1, t = -\frac{x}{3} + \frac{1}{3}$

**Critical thinking questions:**

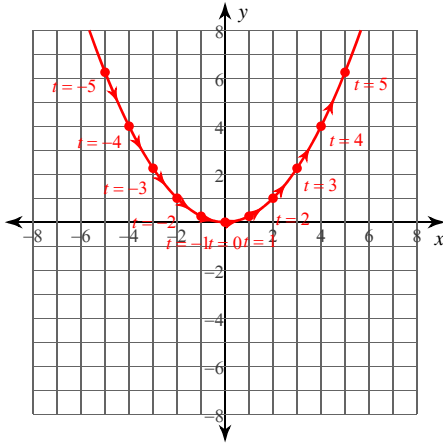
13) Write a set of parametric equations that represent  $y = x^2 - 4x$ . Then write a second set of parametric equations that represent the same function, but with a slower speed

14) Write a set of parametric equations that represent  $y = x^2 - 1$ . Then write a second set of parametric equations that represent the same function, but with a faster speed and an opposite orientation.

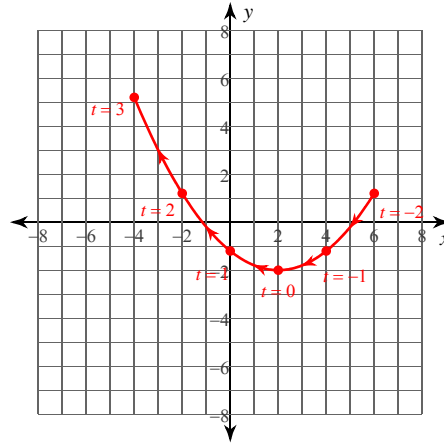
# Parametric Equations

Sketch the curve for each pair of parametric equations.

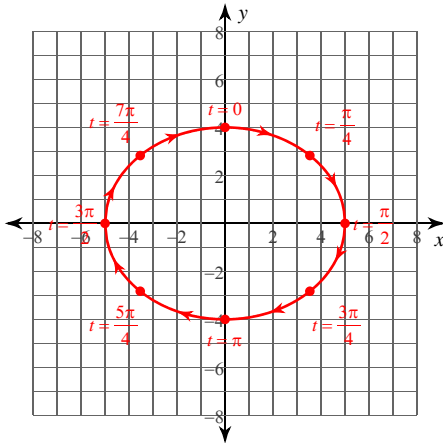
1)  $x = t, y = \frac{t^2}{4}$



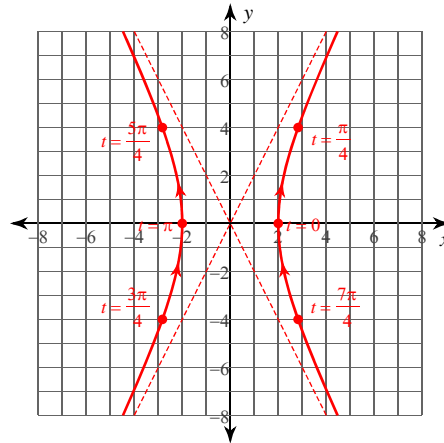
2)  $x = -2t + 2, y = \frac{4t^2}{5} - 2, -2 \leq t \leq 3$



3)  $x = 5\sin t, y = 4\cos t$



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Write each pair of parametric equations in rectangular form.

5)  $x = -\frac{t^2}{3}, y = t$

$$x = -\frac{y^2}{3}$$

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$$y = \frac{x^2}{6} + \frac{2x}{3} - \frac{1}{3}$$

7)  $x = -2t - 3, y = 2t^2 + 2t - \frac{5}{2}$

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

8)  $x = 2\sin t, y = 4\cos t$

$$\frac{x^2}{4} + \frac{y^2}{16} = 1$$

9)  $x = \sec t, y = 4\tan t$

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

10)  $x = 4\cos t - 1, y = 3\sin t + 1$

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

Use the parameter to write each rectangular equation as a pair of parametric equations.

11)  $x = \frac{y^2}{6}, t = y$

$$x = \frac{t^2}{6}, y = t$$

12)  $y = -\frac{x^2}{4} + x + 1, t = -\frac{x}{3} + \frac{1}{3}$

$$x = -3t + 1, y = -\frac{9t^2}{4} - \frac{3t}{2} + \frac{7}{4}$$

**Critical thinking questions:**

- 13) Write a set of parametric equations that represent  $y = x^2 - 4x$ . Then write a second set of parametric equations that represent the same function, but with a slower speed

Many answers. Ex:  $y = t^2 - 4t, x = t$  and  $y = \frac{t^2}{4} - 2t, x = \frac{t}{2}$

- 14) Write a set of parametric equations that represent  $y = x^2 - 1$ . Then write a second set of parametric equations that represent the same function, but with a faster speed and an opposite orientation.

Many answers. Ex:  $y = t^2 - 1, x = t$  and  $y = 4t^2 - 1, x = -2t$