

Write each pair of parametric equations as a single equation in  $x$  and  $y$ .

15.  $\begin{cases} x(t) = 2t \\ y(t) = t - 1 \end{cases}$

16.  $\begin{cases} x(t) = t + 3 \\ y(t) = 3t \end{cases}$

17.  $\begin{cases} x(t) = 2t + 1 \\ y(t) = t + 5 \end{cases}$

18.  $\begin{cases} x(t) = t - 2 \\ y(t) = t + 7 \end{cases}$

19.  $\begin{cases} x(t) = 3t \\ y(t) = 1 - t \end{cases}$

20.  $\begin{cases} x(t) = t \\ y(t) = 3 - 2t \end{cases}$

21.  $\begin{cases} x(t) = 2t \\ y(t) = t^2 - 1 \end{cases}$

22.  $\begin{cases} x(t) = t^2 \\ y(t) = \frac{t}{2} \end{cases}$

23.  $\begin{cases} x(t) = \frac{1}{3}t \\ y(t) = t^2 \end{cases}$

24.  $\begin{cases} x(t) = t^2 + 2t \\ y(t) = 2t \end{cases}$

25.  $\begin{cases} x(t) = 5 - t^2 \\ y(t) = \frac{3}{2}t \end{cases}$

26.  $\begin{cases} x(t) = 2 - 3t^2 \\ y(t) = -\frac{1}{3}t \end{cases}$

Graph the function represented by each pair of parametric equations. Then graph its inverse on the same coordinate plane.

27.  $\begin{cases} x(t) = t^2 - 2 \\ y(t) = t \end{cases}$

28.  $\begin{cases} x(t) = t^2 \\ y(t) = t + 3 \end{cases}$

29.  $\begin{cases} x(t) = t \\ y(t) = 6 - t^2 \end{cases}$

30.  $\begin{cases} x(t) = 4 - t \\ y(t) = t^2 - 1 \end{cases}$

31.  $\begin{cases} x(t) = t^2 + 5t - 1 \\ y(t) = t + 1 \end{cases}$

32.  $\begin{cases} x(t) = 4 + 5t - t^2 \\ y(t) = t - 1 \end{cases}$

33. Write a pair of parametric equations to represent a line that has a slope of 3 and contains the point  $(4, -5)$ .

34. **TRANSFORMATIONS** Write the pair of parametric equations that represent a transformation of  $\begin{cases} x(t) = t \\ y(t) = t^2 \end{cases}$  1 unit down and 2 units to the right.

35. **SPORTS** Frannie throws a softball from one end of a 200-foot field. The ball leaves her hand at a height of 6.5 feet with an initial velocity of 60 feet per second in the horizontal direction and 40 feet per second in the vertical direction. If  $x(t)$  gives the horizontal distance in feet after  $t$  seconds and  $y(t)$  gives the vertical distance in feet after  $t$  seconds, the following parametric equations describe the ball's path:

$$\begin{cases} x(t) = 60t \\ y(t) = 6.5 + 40t - 16t^2 \end{cases}$$

- How high does the ball get? How long does it take for the ball to reach this height?
- What horizontal distance will the ball travel before it hits the ground? How long does it take for the ball to reach this point?

**37 AVIATION** An airplane at an altitude of 2000 feet is descending at a constant rate of 160 feet per second horizontally and 15 feet per second vertically.

- Write the pair of parametric equations that represent the airplane's flight path.
- After how many seconds will the airplane touch down?
- What horizontal distance will the airplane have traveled when it touches down on the runway?

**38 HEALTH** A newborn baby weighs 7 pounds and is 21 inches long. During each of the first 6 months, the baby grows  $\frac{1}{2}$  inch in length and gains 2 pounds.

- Write the parametric equations describing the height and weight for  $t$  months, where  $0 < t < 6$ .
- How many months will it take for the baby to weigh 14 pounds? How long is the baby at this time?
- How many months will it take for the baby to reach 23 inches? How much does the baby weigh at this time?