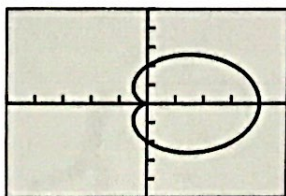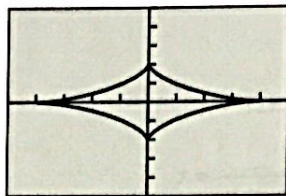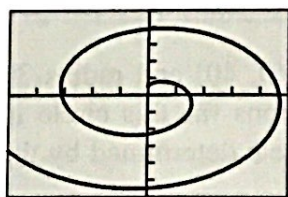# SECTION 6.3 EXERCISES

In Exercises 1–4, match the parametric equations with their graph. Identify the viewing window that seems to have been used.

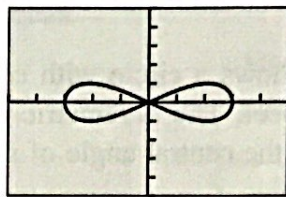

(a)

(b)

(c)

(d)

1. $x = 4\cos^3 t$, $y = 2\sin^3 t$ 2. $x = 3\cos t$, $y = \sin 2t$

3. $x = 2\cos t + 2\cos^2 t$, $y = 2\sin t + \sin 2t$

4. $x = \sin t - t\cos t$, $y = \cos t + t\sin t$

In Exercises 5 and 6, (a) complete the table for the parametric equations and (b) plot the corresponding points.

5. $x = t + 2$, $y = 1 + 3/t$

t	-2	-1	0	1	2
x					
y					

6. $x = \cos t$, $y = \sin t$

t	0	$\pi/2$	π	$3\pi/2$	2π
x					
y					

In Exercises 7–10, graph the parametric equations $x = 3 - t^2$, $y = 2t$, in the specified parameter interval. Use the standard viewing window.

7. $0 \le t \le 10$ 8. $-10 \le t \le 0$

9. $-3 \le t \le 3$ 10. $-2 \le t \le 4$

In Exercises 11–26, eliminate the parameter and identify the graph of the parametric curve.

11. $x = 1 + t$, $y = t$ 12. $x = 2 - 3t$, $y = 5 + t$

13. $x = 2t - 3$, $y = 9 - 4t$, $3 \le t \le 5$

14. $x = 5 - 3t$, $y = 2 + t$, $-1 \le t \le 3$

15. $x = t^2$, $y = t + 1$ [*Hint:* Eliminate t and solve for x in terms of y.]

16. $x = t$, $y = t^2 - 3$ 17. $x = t$, $y = t^3 - 2t + 3$

18. $x = 2t^2 - 1$, $y = t$ [*Hint:* Eliminate t and solve for x in terms of y.]

19. $x = 4 - t^2$, $y = t$ [*Hint:* Eliminate t and solve for x in terms of y.]

20. $x = 0.5t$, $y = 2t^3 - 3$, $-2 \le t \le 2$

21. $x = t - 3$, $y = 2/t$, $-5 \le t \le 5$

22. $x = t + 2$, $y = 4/t$, $t \ge 2$

23. $x = 5\cos t$, $y = 5\sin t$ 24. $x = 4\cos t$, $y = 4\sin t$

25. $x = 2\sin t$, $y = 2\cos t$, $0 \le t \le 3\pi/2$

26. $x = 3\cos t$, $y = 3\sin t$, $0 \le t \le \pi$

In Exercises 27–32 find a parametrization for the curve.

27. The line through the points $(-2, 5)$ and $(4, 2)$.

28. The line through the points $(-3, -3)$ and $(5, 1)$.

29. The line segment with endpoints $(3, 4)$ and $(6, -3)$.

30. The line segment with endpoints $(5, 2)$ and $(-2, -4)$.

31. The circle with center $(5, 2)$ and radius 3.

32. The circle with center $(-2, -4)$ and radius 2.

Exercises 33–36 refer to the graph of the parametric equations
$$x = 2 - |t|, \quad y = t - 0.5, \quad -3 \le t \le 3$$
given below. Find the values of the parameter t that produces the graph in the indicated quadrant.
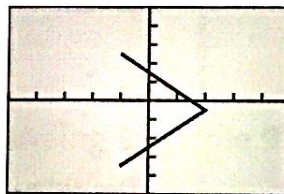
[–5, 5] by [–5, 5]

33. Quadrant I   34. Quadrant II

35. Quadrant III   36. Quadrant IV

37. **Simulating a Foot Race** Ben can sprint at the rate of 24 ft/sec. Jerry sprints at 20 ft/sec. Ben gives Jerry a 10-ft head start. The parametric equations can be used to model a race.
$$x_1 = 20t, \qquad y_1 = 3$$
$$x_2 = 24t - 10, \quad y_2 = 5$$

(a) Find a viewing window to simulate a 100-yd dash. Graph simultaneously with t starting at $t = 0$ and Tstep $= 0.05$.

(b) Who is ahead after 3 sec and by how much?

38. **Capture the Flag** Two opposing players in "Capture the Flag" are 100 ft apart. On a signal, they run to capture a flag that is on the ground midway between them. The faster runner, however, hesitates for 0.1 sec. The following