9.2 Parametric Equations 2023-2024

SCORE:

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Name _____ Date _____ Period _____

Complete the table that accompanies each pair of parametric equations.

1. $x = 4t+1,\ \ y = t-2,\ \ for\ 0 \le t \le 3$

t	x	y
0		
1		
	7	
		1

2. $x = 3-t,\ \ y = 2t+5,\ \ for\ 2 \le t \le 7$

t	x	y
2		
3		
	-2	
		19

3. $x = t^2,\ \ y = 3t-1,\ \ for\ 1 \le t \le 5$

t	x	y
1		
2.5		
	5	
		11
	25	

4. $x = \sqrt{t},\ \ y = t+4,\ \ for\ 0 \le t \le 9$

t	x	y
0		
2		
4		
		12
	3	

Graph each pair of parametric equations in the rectangular coordinate system. No calculators.

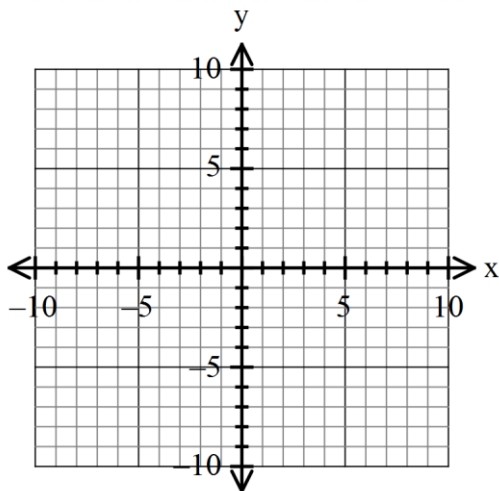5. $x = 3t-2,\ \ y = t+3,\ \ for\ 0 \le t \le 4$

t	x	y
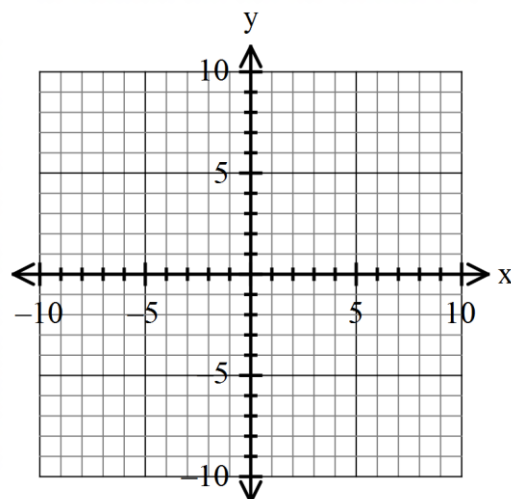
6. $x = 4 - 3t, \quad y = 3 - t, \quad for \ 1 \le t \le 3$

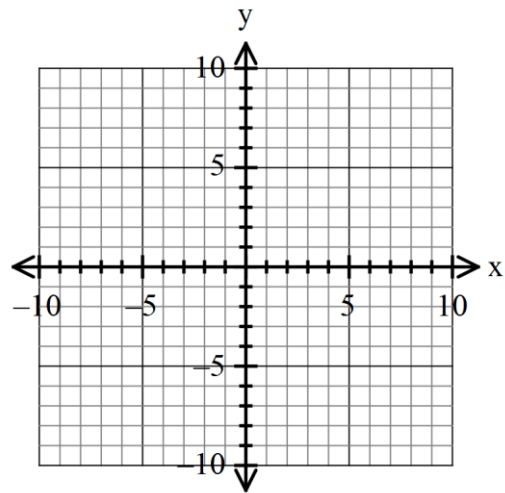| t	x	y
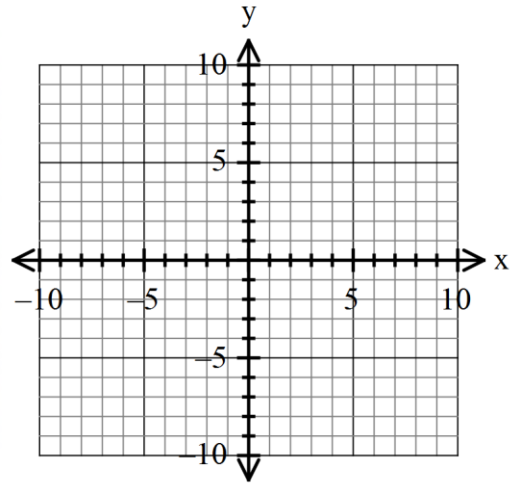
In exercises 7-10 graph the parametric equations $x = 3 - t^2, y = 2t$ **in the specified parameter interval.**
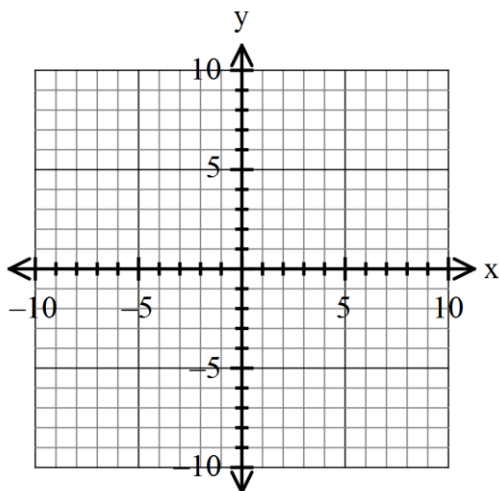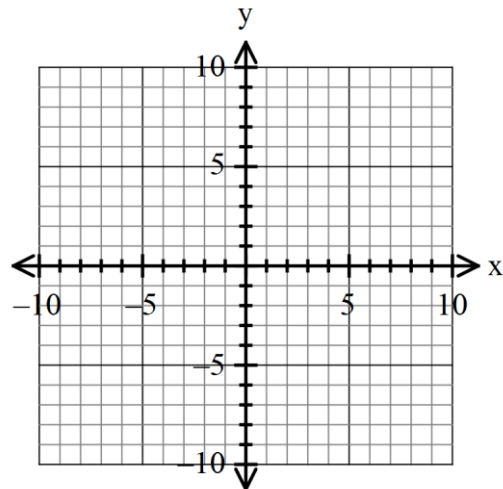
7. $0 \le t \le 10$
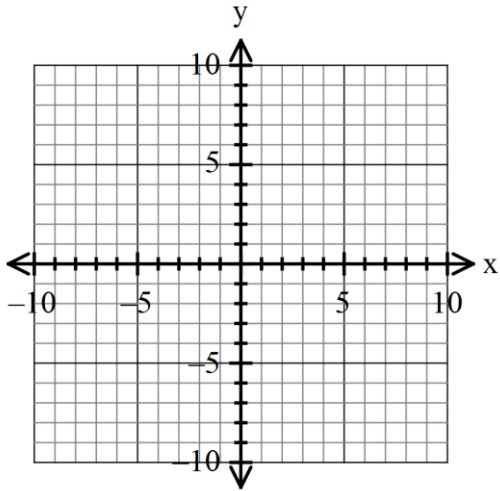

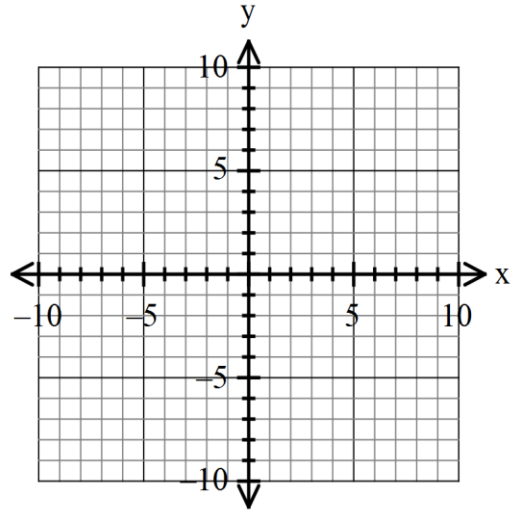8. $-10 \le t \le 0$

9. $-3 \le t \le 3$

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

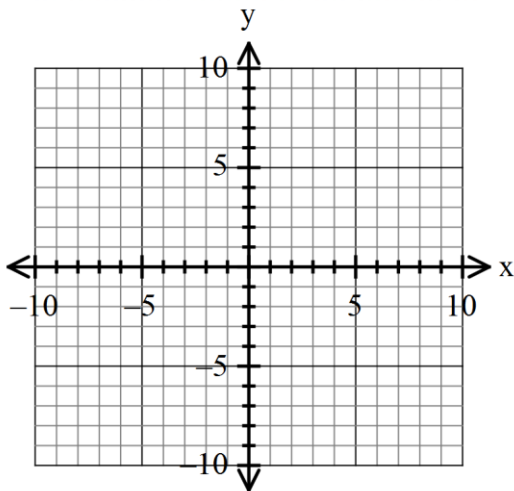**Using a graphing calculator, graph each pair of parametric equations in the rectangular coordinate system.**

11. $x=t+2,\ y=-2t+1,$ for $-3\le t\le 1$

12. $x=t-1,\ y=t^2,$ for t in $(-\infty,\infty)$

13. $x=t-3,\ y=\dfrac{1}{t},$ for t in $(-\infty,\infty)$

14. $x=\cos t,\ y=\sin t$ (radians)
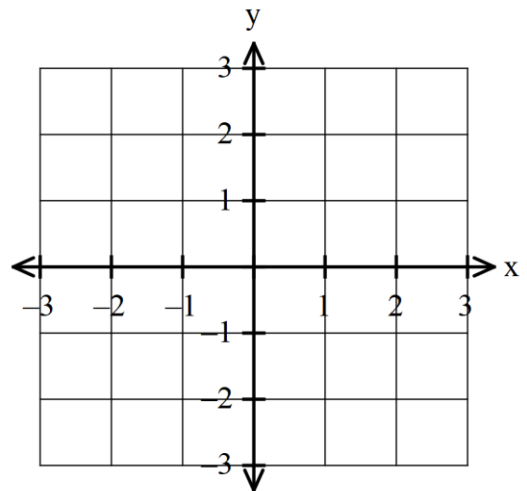
Identify the type of graph made by each equation.

15. $f(x) = 2(x-3)^2 + 5$

16. $(x-3)^2 + (y+4)^2 = 25$

17. $f(x) = 2 + 3\sqrt{x-7}$

18. $f(x) = \frac{1}{3}x + 8$

19. $f(x) = x^3 - 8x + 4$

20. $3x - 4y = 12$

Eliminate the parameter and identify the graph of each pair of parametric equations.

21. $x = 4t - 5, \quad y = 3 - 4t$

Type of graph:

22. $x = 2t - 3, \quad y = 9 - 4t$

Type of graph:

23. $x = t, \quad y = t^2 - 3$

Type of graph:

24. $x = -4\sin 3t, \quad y = 4\cos 3t$

Type of graph:

25. $x = 5\sin t, \quad y = 5\cos t$

Type of graph:

26. $x = 2\sin t \cos t, \quad y = 3\sin 2t$

Type of graph:

27. $x = t + 4, \quad y = \sqrt{t - 5}$

Type of graph:

28. $x = 2\cos^2 t - 1, \quad y = 5\cos 2t$

Type of graph:

29. The length of the hypotenuse of a right triangle is 66 feet and one of the acute angles is 33°. Find the other acute angle and the lengths of the legs. Round answers to the nearest tenth.

30. Suppose α is an angle is standard position whose terminal side contains the point (-3, 5). Find sin α, cos α, and tan α.

For each polar equation, write an equivalent rectangular equation.

31. $r = 2 \sin \theta$

For each rectangular equation, write an equivalent polar equation.

32. $x^2 + y^2 = 49$

Find all the real zeros.

33. $x^2 + 2x - 48 = 0$ 34. $f(x) = 2x^3 - 3x^2 - 4x + 6$

Without graphing, state the degree of the polynomial, then <u>write the end behavior as a limit.</u>

35. $f(x) = x^5 + 3x^4 - 2x^3 - 5x^2 - 10x + 1$ Degree:

$\lim_{x \to -\infty} f(x) =$ $\lim_{x \to \infty} f(x) =$