

# Parametric Equations, Symmetric Equations, and Polar Conics

Parametric models, symmetric equations, and conics in alternate polar or parametric representations.

Name \_\_\_\_\_ Date \_\_\_\_\_

32 main 2-up grid 2 pages

## Completion Reward



Shown here as a small pack artifact, not a preview destination.

### 1. What do parametric equations do?

- A. Always describe circles or lines
- B. Describe  $x$  and  $y$  in terms of a third parameter
- C. Replace trigonometry
- D. Give only one point

### 2. What do symmetric equations in 3D commonly describe?

- A. A parabola in the plane
- B. A circle centered at the origin
- C. A line in space
- D. A probability model

### 3. What does increasing the parameter usually do?

- A. Always increases  $x$  only
- B. Always increases  $y$  only
- C. Makes the graph disappear
- D. Moves the point along the curve in a chosen direction

### 4. Which parametric system describes the line $y = 2x + 1$ ?

- A.  $x = t, y = 2t + 1$
- B.  $x = 2t + 1, y = t$
- C.  $x = t^2, y = 2t + 1$
- D.  $x = \cos(t), y = \sin(t)$

### 5. Which parametric system traces the unit circle?

- A.  $x = t, y = t^2$
- B.  $x = \sec(t), y = \tan(t)$
- C.  $x = \cos(t), y = \sin(t)$
- D.  $x = 1 + t, y = 1 - t$

### 6. Why eliminate the parameter?

- A. To rewrite the curve in rectangular form when possible
- B. To remove all points except one
- C. To force the curve to become linear
- D. To guarantee  $x$  and  $y$  are both increasing

### 7. What does a polar conic equation often track?

- A. Distance from a focus as the angle changes
- B. Only the  $x$ -intercept as time changes
- C. The determinant of a  $2 \times 2$  matrix
- D. A sequence of probabilities

### 8. If $x = 2t + 1$ and $y = 3t - 4$ , what is the best first step to eliminate $t$ ?

- A. Square both equations
- B. Differentiate both equations
- C. Convert to polar form
- D. Solve one equation for  $t$

### 9. If $x = 3\cos(t)$ and $y = 3\sin(t)$ , what is the best way to eliminate $t$ ?

- A. Solve each equation for  $t$  separately
- B. Add  $x$  and  $y$
- C. Use the Law of Cosines
- D. Use  $\cos^2(t) + \sin^2(t) = 1$

### 10. A student has $x = t + 2$ and writes $t = x + 2$ . What is wrong?

- A.  $t$  should equal  $2x$
- B. You cannot solve for  $t$
- C. It should be  $t = x - 2$
- D. Nothing is wrong

### 11. A student says $x = 3\cos(t), y = 3\sin(t)$ traces a line because $x$ and $y$ both change. What is wrong?

- A. Those equations keep  $x^2 + y^2$  fixed at 9, so the graph is a circle
- B. The graph is a parabola because sine is nonlinear
- C. Parametric equations can only make lines
- D. Nothing is wrong because both coordinates change

### 12. If $x = 2t + 1$ and $y = t^2$ , find $x$ when $t = 3$ . Answer with a number.

### 13. If $x = 2t + 1$ and $y = t^2$ , find $y$ when $t = 3$ . Answer with a number.

### 14. If $x = 5\cos(t)$ and $y = 5\sin(t)$ , find $x$ when $t = 0$ . Answer with a number.

### 15. If $x = 5\cos(t)$ and $y = 5\sin(t)$ , find $y$ when $t = \pi/2$ . Answer with a number.

### 16. For $x = 1 + t, y = 2 - t, z = 3t$ , find $z$ when $t = 2$ . Answer with a number.

### 17. For $x = 1 + t, y = 2 - t, z = 3t$ , find $y$ when $t = 2$ . Answer with a number.

### 18. If $x = t + 1$ and $y = 2t - 3$ , what is $y$ when $x = 5$ ? Answer with a number.

### 19. If $x = t^2$ and $y = t$ , what is $x$ when $y = -3$ ? Answer with a number.

### 20. If $r = 2 / (1 + \cos(\theta))$ , find $r$ when $\theta = \pi/2$ . Answer with a number.

### 21. If $r = 6 / (1 + 2\cos(\theta))$ , find $r$ when $\theta = \pi/2$ . Answer with a number.

### 22. If $x = 4 - t$ and $y = 1 + 2t$ , find $x$ when $t = -2$ . Answer with a number.

### 23. If $x = 4 - t$ and $y = 1 + 2t$ , find $y$ when $t = -2$ . Answer with a number.

### 24. Write a parametric system for the line $y = 3x - 2$ using $x = t$ . Answer as an equation.

25. Eliminate  $t$  from  $x = t + 2$  and  $y = 3t - 1$ . Answer as an equation.

26. Eliminate  $t$  from  $x = 2\cos(t)$ ,  $y = 2\sin(t)$ . Answer as an equation.

27. Write the symmetric equations for  $x = 1 + 2t$ ,  $y = -3 + 4t$ . Answer as an equation.

28. Write a standard parameterization of the unit circle. Answer as an equation.

29. Write a simple polar conic form with eccentricity  $e$  and directrix parameter  $d$ . Answer as an equation.

30. Write a standard parameterization of  $y = x^2$ . Answer as an equation.

31. If  $x = t - 1$  and  $y = 2t + 3$ , which rectangular equation is correct?

- A.  $y = 2x + 1$
- B.  $y = 2x + 5$
- C.  $y = x + 5$
- D.  $y = x - 5$

32. If  $x = 4\cos(t)$  and  $y = 4\sin(t)$ , which rectangular equation is correct?

- A.  $x + y = 4$
- B.  $y = 4x$
- C.  $x^2 - y^2 = 16$
- D.  $x^2 + y^2 = 16$