

# Conics in Rectangular Coordinates and Rotation of Axes

Parabolas, ellipses, hyperbolas, general conic form, and rotation of axes.

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

32 main 2-up grid 2 pages

## Completion Reward



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

1. Which equation is a parabola?

- A.  $y = x^2 - 4$
- B.  $x^2 + y^2 = 9$
- C.  $x^2/9 + y^2/4 = 1$
- D.  $x^2/9 - y^2/4 = 1$

2. Which equation is a circle?

- A.  $y = x^2$
- B.  $x^2/16 + y^2/16 = 1$
- C.  $x^2/16 - y^2/9 = 1$
- D.  $x^2 + y^2 = 16$

3. Which equation is an ellipse?

- A.  $x^2 + y^2 = 9$
- B.  $x^2/9 + y^2/4 = 1$
- C.  $x^2/9 - y^2/4 = 1$
- D.  $y^2 = 4x$

4. Which equation is a hyperbola?

- A.  $x^2/9 - y^2/4 = 1$
- B.  $x^2/9 + y^2/4 = 1$
- C.  $x^2 + y^2 = 16$
- D.  $y = x^2$

5. What is the vertex of  $y = (x - 2)^2 + 3$ ?

- A. (-2, 3)
- B. (2, 3)
- C. (2, -3)
- D. (3, 2)

6. What is the center of  $(x - 1)^2/9 + (y + 2)^2/4 = 1$ ?

- A. (-1, 2)
- B. (1, -2)
- C. (1, 2)
- D. (0, 0)

7. What is the center of  $(x + 3)^2/16 - (y - 1)^2/9 = 1$ ?

- A. (-3, 1)
- B. (3, -1)
- C. (-3, -1)
- D. (0, 0)

8. For  $x^2/25 + y^2/9 = 1$ , which axis is the major axis?

- A. Vertical
- B. Horizontal
- C. Neither because both denominators are positive
- D. Diagonal

9. For  $x^2/16 - y^2/9 = 1$ , how does the hyperbola open?

- A. Up and down
- B. Left and right
- C. In a circle
- D. As a line

10. To rewrite  $x^2 - 6x + y^2 = 7$  as a shifted circle, what is the best first step?

- A. Factor the equation
- B. Divide everything by x
- C. Differentiate both sides
- D. Complete the square in x

11. A student says the center of  $(x - 4)^2 + (y + 1)^2 = 9$  is (-4, 1). What is wrong?

- A. The center should be (4, 1)
- B. The center should be (-4, -1)
- C. The center should be (4, -1)
- D. Nothing is wrong

12. For  $x^2 + y^2 = 49$ , find the radius. Answer with a number.

13. Find the x-coordinate of the vertex of  $y = (x - 3)^2 + 1$ . Answer with a number.

14. Find the y-coordinate of the vertex of  $y = (x - 3)^2 + 1$ . Answer with a number.

15. Find the x-coordinate of the center of  $(x - 2)^2/16 + (y + 4)^2/9 = 1$ . Answer with a number.

16. Find the y-coordinate of the center of  $(x - 2)^2/16 + (y + 4)^2/9 = 1$ . Answer with a number.

17. For  $x^2/25 + y^2/9 = 1$ , find a. Answer with a number.

18. For  $x^2/25 + y^2/9 = 1$ , find b. Answer with a number.

19. For  $x^2/16 - y^2/9 = 1$ , find a. Answer with a number.

20. For  $x^2/16 - y^2/9 = 1$ , find b. Answer with a number.

21. Find the x-coordinate of the center of  $(x - 6)^2 + (y + 2)^2 = 25$ . Answer with a number.

22. Find the y-coordinate of the center of  $(x - 6)^2 + (y + 2)^2 = 25$ . Answer with a number.

23. For  $(x - 6)^2 + (y + 2)^2 = 25$ , find the radius. Answer with a number.

24. Write the standard equation of a circle centered at (0, 0) with radius 4. Answer in the form  $x = \dots$

25. Write the equation of a circle centered at (2, -3) with radius 5. Answer in the form  $x = \dots$
26. Write the standard form of an ellipse centered at the origin with  $a = 5$  and  $b = 3$ , major axis horizontal. Answer as an equation.
27. Write the standard form of a hyperbola centered at the origin with  $a = 4$  and  $b = 3$  opening left and right. Answer as an equation.
28. Write a parabola with vertex (3, -2) opening upward in simple vertex form. Answer in the form  $y = \dots$
29. Complete the square result for  $x^2 - 6x$ . Answer as an equation.
30. Complete the square result for  $y^2 + 8y$ . Answer as an equation.
31. Which student correctly classifies  $x^2 / 4 + y^2 / 9 = 1$ ?
- A. Student A: ellipse  
B. Student B: circle  
C. Student C: hyperbola  
D. Student D: parabola
32. Which point is the vertex of  $y = (x + 5)^2 - 2$ ?
- A. (5, -2)  
B. (-5, 2)  
C. (-5, -2)  
D. (2, -5)