

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 11 pages visible side quests

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. $x^2/9 - y^2/4 = 1$

1.1. Which equation is a parabola?

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

1.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

1.3. 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. $y = x^2 + 1$

1.4. Which equation is a hyperbola?

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

1.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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. $x^2 + y^2 = 16$

2.1. Which equation is a parabola?

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

2.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

2.3. Which equation is an ellipse?

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

2.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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. $y^2 = 4x$

3.1. Which equation is a parabola?

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

3.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

3.3. Which equation is an ellipse?

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- D. $y = x^2 + 1$

3.4. Which equation is a hyperbola?

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

3.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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. $y = x^2$

4.1. Which equation is a parabola?

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

4.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

4.3. Which equation is an ellipse?

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

4.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

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

5.1. Which equation is a parabola?

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

5.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
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- D. $x^2 + y^2 = 4$

5.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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)

6.1. Which equation is a parabola?

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

6.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
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6.3. Which equation is an ellipse?

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

6.4. Which equation is a hyperbola?

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

6.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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)

7.3. 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. $y = x^2 + 1$

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

8.3. 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. $y = x^2 + 1$

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

9.3. 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. $y = x^2 + 1$

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

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

8.4. Which equation is a hyperbola?

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

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- C. $x^2 / 16 - y^2 / 4 = 1$
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7.5. A basic axis-aligned conic with one squared variable is a:

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9.5. A basic axis-aligned conic with one squared variable is a:

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- C. hyperbola
- D. parabola

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

10.3. In $(x + 4)^2 / 9 + (y - 2)^2 / 4 = 1$, the center is:

- A. (-4, 2)
- B. (4, -2)
- C. (-4, -2)
- D. (4, 2)

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

11.3. In $(x + 4)^2 / 9 + (y - 2)^2 / 4 = 1$, the center is:

- A. (-4, 2)
- B. (4, -2)
- C. (-4, -2)
- D. (4, 2)

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

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

12.3. 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. $y = x^2 + 1$

10.1. In $y = (x - 2)^2 + 5$, the vertex is:

- A. (2, 5)
- B. (-2, 5)
- C. (5, 2)
- D. (2, -5)

10.4. If the x-term is positive and the y-term is subtracted in a hyperbola, the hyperbola opens:

- A. up and down
- B. left and right
- C. in circles
- D. toward the origin

11.1. In $y = (x - 2)^2 + 5$, the vertex is:

- A. (2, 5)
- B. (-2, 5)
- C. (5, 2)
- D. (2, -5)

11.4. If the x-term is positive and the y-term is subtracted in a hyperbola, the hyperbola opens:

- A. up and down
- B. left and right
- C. in circles
- D. toward the origin

12.1. Which equation is a parabola?

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

12.4. Which equation is a hyperbola?

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

10.2. In $(x - 3)^2 + (y + 1)^2 = 16$, the center is:

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

10.5. When completing the square for a conic, the goal is to rewrite it into:

- A. standard translated form
- B. slope-intercept form
- C. factored form
- D. recursive form

11.2. In $(x - 3)^2 + (y + 1)^2 = 16$, the center is:

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

11.5. When completing the square for a conic, the goal is to rewrite it into:

- A. standard translated form
- B. slope-intercept form
- C. factored form
- D. recursive form

12.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2 / 4 - y^2 / 9 = 1$
- D. $x^2 / 9 + y^2 / 4 = 1$

12.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

13.1. Which equation is a parabola?

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

13.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

13.3. 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. $y = x^2 + 1$

13.4. Which equation is a hyperbola?

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

13.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

14.1. Which equation is a parabola?

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

14.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

14.3. 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. $y = x^2 + 1$

14.4. Which equation is a hyperbola?

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

14.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

15.1. Which equation is a parabola?

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

15.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

15.3. 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. $y = x^2 + 1$

15.4. Which equation is a hyperbola?

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

15.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

16.1. Which equation is a parabola?

16.2. Which equation is a circle?

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

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2 / 4 - y^2 / 9 = 1$
- D. $x^2 / 9 + y^2 / 4 = 1$

16.3. Which equation is an ellipse?

16.4. Which equation is a hyperbola?

16.5. A basic axis-aligned conic with one squared variable is a:

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

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

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

17.1. Which equation is a parabola?

17.2. Which equation is a circle?

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

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2 / 4 - y^2 / 9 = 1$
- D. $x^2 / 9 + y^2 / 4 = 1$

17.3. Which equation is an ellipse?

17.4. Which equation is a hyperbola?

17.5. A basic axis-aligned conic with one squared variable is a:

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

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

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

18.1. Which equation is a parabola?

18.2. Which equation is a circle?

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

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2 / 4 - y^2 / 9 = 1$
- D. $x^2 / 9 + y^2 / 4 = 1$

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

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

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

19.1. Which equation is a parabola?

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

19.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

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

19.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

20.1. Which equation is a parabola?

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

20.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

20.3. 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. $y = x^2 + 1$

20.4. Which equation is a hyperbola?

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

20.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

21.1. Which equation is a parabola?

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

21.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

21.3. 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. $y = x^2 + 1$

21.4. Which equation is a hyperbola?

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

21.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

22.1. Which equation is a parabola?

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

22.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

22.3. 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. $y = x^2 + 1$

22.4. Which equation is a hyperbola?

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

22.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

23.1. Which equation is a parabola?

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

23.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

23.3. 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. $y = x^2 + 1$

23.4. Which equation is a hyperbola?

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

23.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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

24.1. Which equation is a parabola?

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

24.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

24.3. 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. $y = x^2 + 1$

24.4. Which equation is a hyperbola?

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

24.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

25. Write the equation of a circle centered at (2, -3) with radius 5. Answer in the form $x = \dots$

25.1. Which equation is a parabola?

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

25.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

25.3. 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. $y = x^2 + 1$

25.4. Which equation is a hyperbola?

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

25.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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.

26.1. Which equation is a parabola?

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

26.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

26.3. 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. $y = x^2 + 1$

26.4. Which equation is a hyperbola?

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

26.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

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.

27.1. Which equation is a parabola?

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

27.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

27.3. 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. $y = x^2 + 1$

27.4. Which equation is a hyperbola?

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

27.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

28. Write a parabola with vertex (3, -2) opening upward in simple vertex form. Answer in the form $y = \dots$

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

28.3. Which equation is an ellipse?

29. Complete the square result for $x^2 - 6x$. Answer as an equation.

29.3. In $(x + 4)^2/9 + (y - 2)^2/4 = 1$, the center is:

- A. (-4, 2)
- B. (4, -2)
- C. (-4, -2)
- D. (4, 2)

30. Complete the square result for $y^2 + 8y$. Answer as an equation.

30.3. In $(x + 4)^2/9 + (y - 2)^2/4 = 1$, the center is:

- A. (-4, 2)
- B. (4, -2)
- C. (-4, -2)
- D. (4, 2)

28.1. Which equation is a parabola?

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

28.4. Which equation is a hyperbola?

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

29.1. In $y = (x - 2)^2 + 5$, the vertex is:

- A. (2, 5)
- B. (-2, 5)
- C. (5, 2)
- D. (2, -5)

29.4. If the x-term is positive and the y-term is subtracted in a hyperbola, the hyperbola opens:

- A. up and down
- B. left and right
- C. in circles
- D. toward the origin

30.1. In $y = (x - 2)^2 + 5$, the vertex is:

- A. (2, 5)
- B. (-2, 5)
- C. (5, 2)
- D. (2, -5)

30.4. If the x-term is positive and the y-term is subtracted in a hyperbola, the hyperbola opens:

- A. up and down
- B. left and right
- C. in circles
- D. toward the origin

28.2. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/4 - y^2/9 = 1$
- D. $x^2/9 + y^2/4 = 1$

28.5. A basic axis-aligned conic with one squared variable is a:

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

29.2. In $(x - 3)^2 + (y + 1)^2 = 16$, the center is:

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

29.5. When completing the square for a conic, the goal is to rewrite it into:

- A. standard translated form
- B. slope-intercept form
- C. factored form
- D. recursive form

30.2. In $(x - 3)^2 + (y + 1)^2 = 16$, the center is:

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

30.5. When completing the square for a conic, the goal is to rewrite it into:

- A. standard translated form
- B. slope-intercept form
- C. factored form
- D. recursive form

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

31.1. Which equation is a circle?

- A. $x^2 + y^2 = 25$
- B. $y = x^2$
- C. $x^2/9 - y^2/4 = 1$
- D. $x^2/9 + y^2/4 = 1$

31.2. Which equation is an ellipse?

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

31.3. Which equation is a hyperbola?

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

31.4. Which conic has exactly one squared variable in its basic equation?

- A. circle
- B. ellipse
- C. hyperbola
- D. parabola

31.5. For an ellipse or hyperbola in translated form, the center is usually read from:

- A. the signs inside the grouped x and y expressions
- B. the largest denominator only
- C. the constant 1 only
- D. the axis labels

32. Which point is the vertex of $y = (x + 5)^2 - 2$?

- A. (5, -2)
- B. (-5, 2)
- C. (-5, -2)
- D. (2, -5)

32.1. In $y = (x - 2)^2 + 5$, the vertex is:

- A. (2, 5)
- B. (-2, 5)
- C. (5, 2)
- D. (2, -5)

32.2. In $(x - 3)^2 + (y + 1)^2 = 16$, the center is:

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

32.3. In $(x + 4)^2/9 + (y - 2)^2/4 = 1$, the center is:

- A. (-4, 2)
- B. (4, -2)
- C. (-4, -2)
- D. (4, 2)

32.4. If the x-term is positive and the y-term is subtracted in a hyperbola, the hyperbola opens:

- A. up and down
- B. left and right
- C. in circles
- D. toward the origin

32.5. When completing the square for a conic, the goal is to rewrite it into:

- A. standard translated form
- B. slope-intercept form
- C. factored form
- D. recursive form