

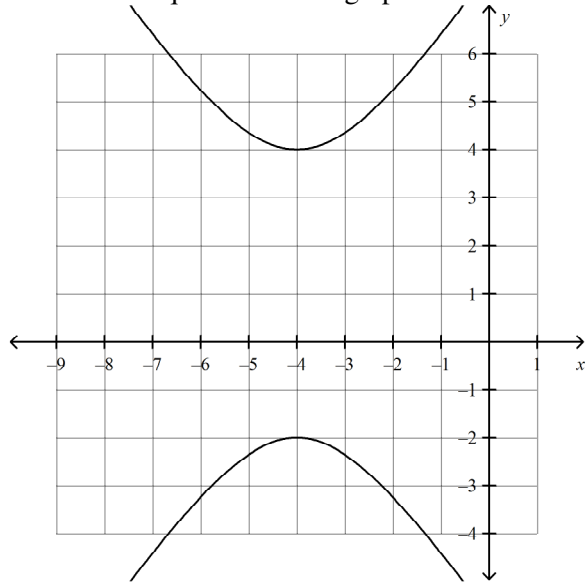
Algebra 2 Semester 2 Final Review

Short Answer

1. An initial population of 895 quail increases at an annual rate of 7%. Write an exponential function to model the quail population.

2. Identify the focus and the directrix of the graph of $y = -\frac{1}{12}x^2$.

3. What is the equation for the graph below?



4. Find the sum of the first thirty integers (1+2+3+...+30)

13. Simplify. $\frac{4a^5}{7b^4} \div \frac{2b^2}{2a^4}$

14. What conic section does this equation represent?
 $4x^2 + 7y^2 + 32x - 56y + 148 = 0$

5. Evaluate $\log_3 9 + \log_3 36 - \log_3 4$.

6. Condense. $5 \log_b q + 2 \log_b y$

7. Simplify $\ln e^3$.

8. Solve $3 \log_4(2x - 6) = 9$.

9. What is the sum of the infinite series: $80 + 20 + 5 + \dots$

10. Simplify. $\frac{20m^{-6}n^{-3}}{5m^{-13}n^{-1}}$

11. An initial population of 610 quail decreases at an annual rate of 21%. Write an exponential function to model the quail population.

12. What conic section does this equation represent?
 $11x^2 - 3y^2 - 88x + 18y + 116 = 0$

15. Write in rational exponent form. $\sqrt[3]{x^7}$
16. What is the radius of the circle $x^2 + y^2 = 36$
17. There are 12 blue marbles and 9 white marbles in a bag. What is the probability of drawing two blue marbles out of the bag if you do not replace them between draws?

19. $\frac{7}{a+8} + \frac{7}{a^2-64}$

20. Write the equation of an asymptote for this hyperbola. $\frac{x^2}{25} - \frac{y^2}{16} = 1$

21. Find the center of the circle with equation: $x^2 + y^2 + 8x - 4y = -11$

22. Solve $\log(4x + 10) = 3$.

23. Find the sum of the first 5 terms of the geometric series $3 + 6 + 12 + \dots$

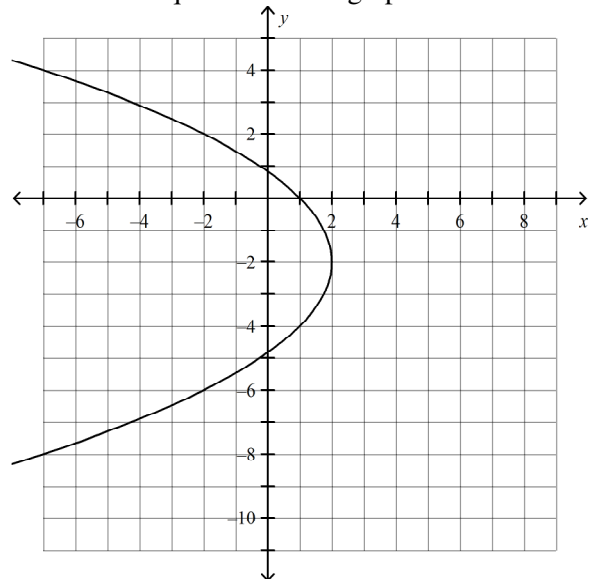
24. Simplify. $\frac{z^2}{z+1} \cdot \frac{z^2+3z+2}{z^2+3z}$

25. Solve. $\frac{x+4}{-2} = \frac{4}{x+3}$

26. Write in standard form. $9x^2 - 4y^2 = 36$

18. Write in radical form. $8^{\frac{4}{3}}$

27. What is the equation for the graph below?



28. Evaluate. $\log_3 243$
29. Solve. $5^{4x} = 125$

30. Mr. Korihor has 8 sophomore boys and 12 sophomore girls. He also has 9 freshman boys and 6 freshman girls. If he randomly chooses a student to do a problem in the front of the class, what is the probability that he chooses a girl given he needs it to be a freshman?

31. Simplify. $\frac{a^2 - 2a - 3}{a^2 - 9a + 18} \cdot \frac{a^2 - 5a - 6}{a^2 + 9a + 8}$

32. What conic section does this equation represent?
 $y^2 - 4x + 6y + 29 = 0$

33. Graph $y = -5\left(\frac{1}{7}\right)^x$.

34. Expand. $\log_7 \frac{n}{2}$

38. Simplify. $(-5g^5h^{-6})^2(g^{-4}h^{-2})^4$

39. What is the common ratio of the geometric sequence: 240, 60, 15, ...

40. Simplify. $\frac{x^2 - 16}{x^2 + 5x + 6} \div \frac{x^2 + 5x + 4}{x^2 - 2x - 8}$

41. Find the center of this hyperbola.

$$\frac{(x + 5)^2}{16} - \frac{(y - 2)^2}{4} = 1$$

35. Simplify. $\frac{q^2 + 11q + 24}{q^2 - 5q - 24}$

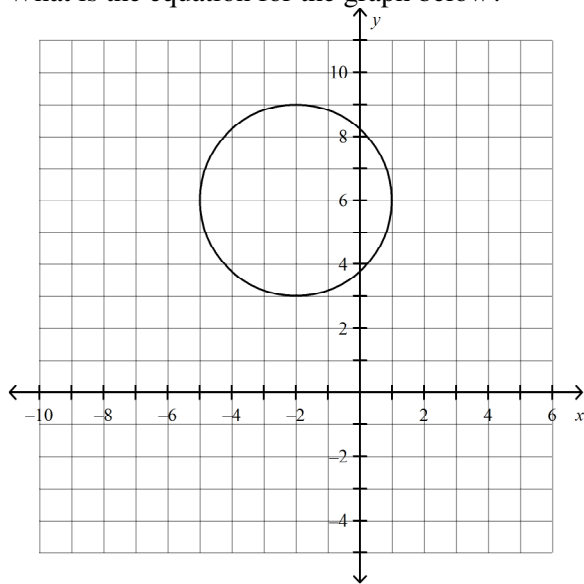
36. Solve $\log 3x + \log 9 = 0$.

37. Use the given rule to write the first three terms of this sequence:
 $a_n = 5 - 6n$ Begin with $n = 1$

42. Find the vertices of the ellipse with the equation

$$\frac{x^2}{49} + \frac{y^2}{64} = 1.$$

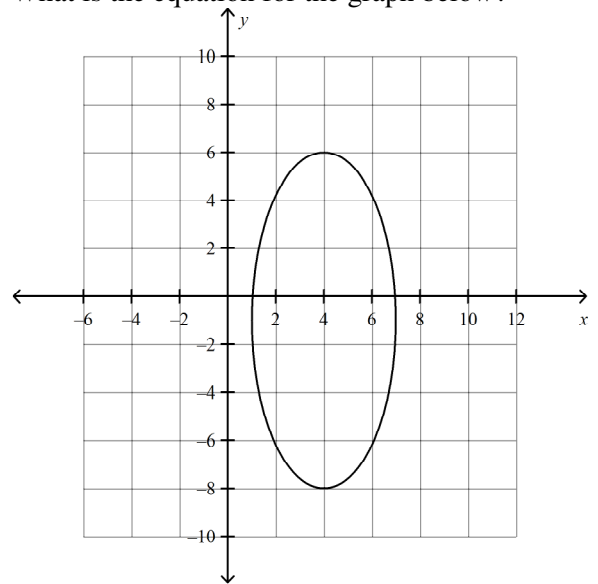
43. What is the equation for the graph below?



44. Find the common difference for the arithmetic sequence where $a_6 = 11$ and $a_{19} = 76$
45. What is the standard deviation of the following data: {14, 9, 7}?

46. Solve.
$$\frac{a}{a^2 - 36} + \frac{2}{a - 6} = \frac{1}{a + 6}$$

47. What is the equation for the graph below?



48. There are 12 ice cream toppings from which to choose. What is the probability that Jose will correctly predict the two toppings that his friend wants?

Algebra 2 Semester 2 Final Review Answer Section

SHORT ANSWER

1. ANS:

$$f(x) = 895(1.07)^x$$

PTS: 1 DIF: L3 REF: 8-1 Exploring Exponential Models
OBJ: 8-1.1 Exponential Growth STA: CA A2 12.0 TOP: 8-1 Example 2
KEY: exponential function | growth factor

2. ANS:

focus $(0, -3)$, directrix at $y = 3$

PTS: 1 DIF: L2 REF: 10-2 Parabolas
OBJ: 10-2.2 Graphing Parabolas STA: CA A2 16.0 TOP: 10-2 Example 4
KEY: directrix | equation of a parabola | focus of a parabola | parabola | graphing

3. ANS:

great

PTS: 1

4. ANS:

$\frac{2}{5}$

PTS: 1

5. ANS:

4

PTS: 1 DIF: L4 REF: 8-4 Properties of Logarithms
OBJ: 8-4.1 Using the Properties of Logarithms STA: CA A2 11.0 | CA A2 14.0
TOP: 8-4 Example 5
KEY: properties of logarithms | evaluating logarithms | Quotient Property of Logarithms

6. ANS:

$$\log_b(q^5y^2)$$

PTS: 1 DIF: L4 REF: 8-4 Properties of Logarithms
OBJ: 8-4.1 Using the Properties of Logarithms STA: CA A2 11.0 | CA A2 14.0
TOP: 8-4 Example 2
KEY: properties of logarithms | logarithm | Product Property of Logarithms | Power Property of Logarithms

7. ANS:

3

PTS: 1 DIF: L4 REF: 8-6 Natural Logarithms
OBJ: 8-6.1 Natural Logarithms STA: CA A2 13.0 | CA A2 14.0 | CA A2 15.0
TOP: 8-6 Example 1
KEY: simplifying a natural logarithm | the number e | natural logarithmic function | inverse functions

8. ANS:
10.7722

PTS: 1 DIF: L3 REF: 8-5 Exponential and Logarithmic Equations
OBJ: 8-5.2 Solving Logarithmic Equations
STA: CA A2 11.0 | CA A2 11.1 | CA A2 13.0 TOP: 8-5 Example 6
KEY: logarithmic equation | properties of logarithms

9. ANS:
 $\frac{2}{5}$

PTS: 1

10. ANS:

$$\frac{m^7}{n^2}$$

PTS: 1 DIF: L2 REF: 7-5 Division Properties of Exponents
OBJ: 7-5.1 Dividing Powers With the Same Base STA: CA A1 2.0 | CA A1 10.0
TOP: 7-5 Example 1 KEY: dividing powers with the same base | exponential expression

11. ANS:

$$f(x) = 610(1.21)^x$$

PTS: 1 DIF: L3 REF: 8-1 Exploring Exponential Models
OBJ: 8-1.1 Exponential Growth STA: CA A2 12.0 TOP: 8-1 Example 2
KEY: exponential function | growth factor

12. ANS:

hyperbola with center (4, 3), foci at $(4 \pm \sqrt{14}, 3)$

PTS: 1 DIF: L2 REF: 10-6 Translating Conic Sections
OBJ: 10-6.2 Identifying Translated Conic Sections STA: CA A2 17.0
TOP: 10-6 Example 4
KEY: completing the square | conic sections | equation of a hyperbola | hyperbola | transverse axis of a hyperbola | foci of a hyperbola | vertices of a hyperbola | center of a hyperbola

13. ANS:

$$\frac{4a}{7b^2}, a \neq 0, b \neq 0$$

PTS: 1 DIF: L2 REF: 9-4 Rational Expressions
OBJ: 9-4.2 Multiplying and Dividing Rational Expressions STA: CA A2 7.0
TOP: 9-4 Example 3
KEY: simplifying a rational expression | restrictions on a variable | multiplying rational expressions

14. ANS:

ellipse with center $(-4, 4)$, foci at $(-4 \pm \sqrt{3}, 4)$

PTS: 1 DIF: L2 REF: 10-6 Translating Conic Sections
 OBJ: 10-6.2 Identifying Translated Conic Sections STA: CA A2 17.0
 TOP: 10-6 Example 4

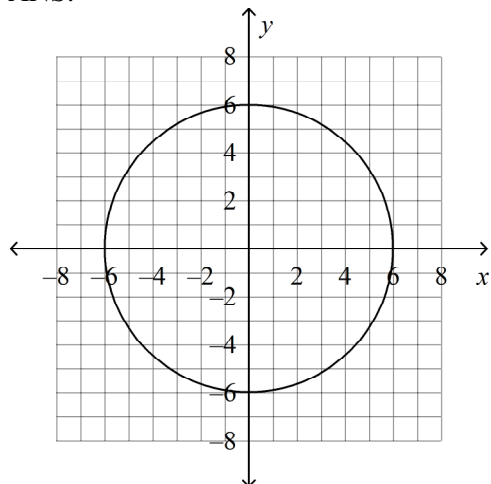
KEY: conic sections | co-vertex of an ellipse | equation of an ellipse | foci of an ellipse | major axis of an ellipse | minor axis of an ellipse | translation | vertex of an ellipse | completing the square

15. ANS:

$$x^5 \cdot \sqrt[3]{42}$$

PTS: 1 DIF: L2 REF: 7-2 Multiplying and Dividing Radical Expressions
 OBJ: 7-2.1 Multiplying Radical Expressions TOP: 7-2 Example 3
 KEY: multiplying radical expressions | simplifying a radical expression

16. ANS:



The graph is a circle of radius 6. Its center is at the origin. Every line through the center is a line of symmetry.

PTS: 1 DIF: L2 REF: 10-1 Exploring Conic Sections
 OBJ: 10-1.1 Graphing Equations of Conic Sections STA: CA A2 17.0
 TOP: 10-1 Example 1 KEY: conic sections | graphing | circle | domain | range

17. ANS:

$\frac{2}{5}$

PTS: 1

18. ANS:

16

PTS: 1 DIF: L2 REF: 7-4 Rational Exponents
 OBJ: 7-4.1 Simplifying Expressions with Rational Exponents STA: CA A2 12.0
 TOP: 7-4 Example 4 KEY: rational exponent

19. ANS:

$$\frac{7a - 49}{(a - 8)(a + 8)}$$

PTS: 1

DIF: L2

REF: 9-5 Adding and Subtracting Rational Expressions

OBJ: 9-5.1 Adding and Subtracting Rational Expressions

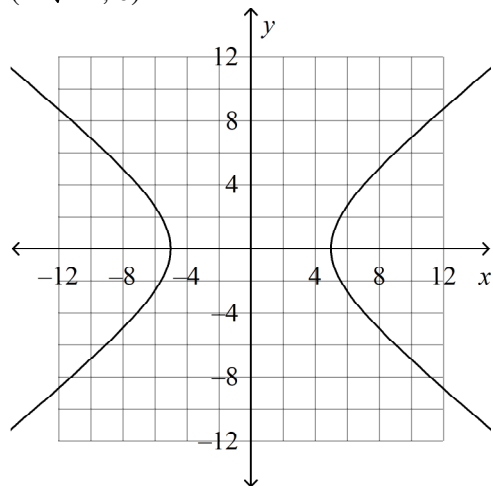
STA: CA A2 7.0

TOP: 9-5 Example 3

KEY: simplifying a rational expression | adding rational expressions

20. ANS:

$$(\pm\sqrt{41}, 0)$$



PTS: 1

DIF: L2

REF: 10-5 Hyperbolas

OBJ: 10-5.2 Using the Foci of a Hyperbola

STA: CA A2 16.0

TOP: 10-5 Example 2

KEY: asymptotes of a hyperbola | equation of a hyperbola | graphing | hyperbola | transverse axis of a hyperbola | vertices of a hyperbola | foci of a hyperbola

21. ANS:

circle; center $(-4, 2)$; radius = 3

PTS: 1

DIF: L2

REF: 10-6 Translating Conic Sections

OBJ: 10-6.2 Identifying Translated Conic Sections

STA: CA A2 17.0

TOP: 10-6 Example 4

KEY: center of a circle | circle | completing the square | conic sections | equation of a circle | radius

22. ANS:

$$\frac{495}{2}$$

PTS: 1

DIF: L3

REF: 8-5 Exponential and Logarithmic Equations

OBJ: 8-5.2 Solving Logarithmic Equations

STA: CA A2 11.0 | CA A2 11.1 | CA A2 13.0

TOP: 8-5 Example 6

KEY: logarithmic equation | properties of logarithms

23. ANS:

$$\frac{2}{5}$$

PTS: 1

24. ANS:

$$\frac{z^2 + 2z}{z + 3}, z \neq -1, 0, -3$$

PTS: 1

DIF: L2

REF: 9-4 Rational Expressions

OBJ: 9-4.2 Multiplying and Dividing Rational Expressions STA: CA A2 7.0

TOP: 9-4 Example 3

KEY: simplifying a rational expression | restrictions on a variable | multiplying rational expressions

25. ANS:

$$-\frac{11}{3}$$

PTS: 1

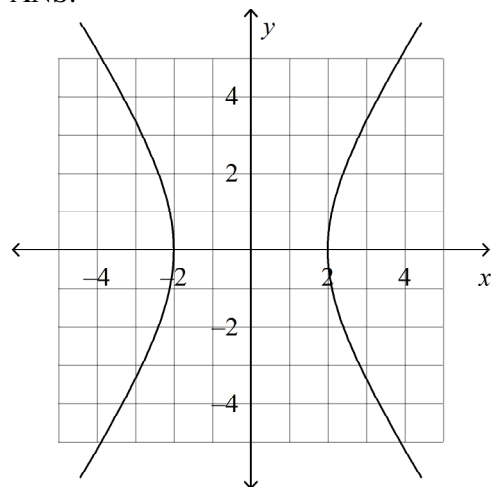
DIF: L2

REF: 9-6 Solving Rational Equations

OBJ: 9-6.1 Solving Rational Equations STA: CA A2 7.0 TOP: 9-6 Example 1

KEY: rational equation

26. ANS:



PTS: 1

DIF: L2

REF: 10-5 Hyperbolas

OBJ: 10-5.1 Graphing Hyperbolas Centered at the Origin STA: CA A2 16.0

TOP: 10-5 Example 1

KEY: hyperbola | equation of a hyperbola | graphing | transverse axis of a hyperbola | vertices of a hyperbola | asymptotes of a hyperbola

27. ANS:

great

PTS: 1

28. ANS:

5

PTS: 1

DIF: L3

REF: 8-3 Logarithmic Functions as Inverses

OBJ: 8-3.1 Writing and Evaluating Logarithmic Expressions STA: CA A2 11.1

TOP: 8-3 Example 3

KEY: evaluating logarithms

29. ANS:
1.19

PTS: 1 DIF: L3 REF: 8-5 Exponential and Logarithmic Equations
OBJ: 8-5.1 Solving Exponential Equations STA: CA A2 11.0 | CA A2 11.1 | CA A2 13.0
TOP: 8-5 Example 2 KEY: graphing | exponential equation

30. ANS:
 $\frac{2}{5}$

PTS: 1

31. ANS:

$$\frac{21a - 28}{(a - 6)(a + 8)}$$

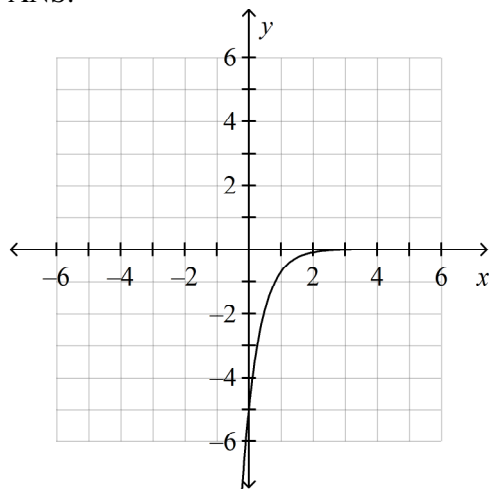
PTS: 1 DIF: L3 REF: 9-5 Adding and Subtracting Rational Expressions
OBJ: 9-5.1 Adding and Subtracting Rational Expressions STA: CA A2 7.0
TOP: 9-5 Example 4
KEY: simplifying a rational expression | subtracting rational expressions

32. ANS:

parabola; vertex (5, -3)

PTS: 1 DIF: L2 REF: 10-6 Translating Conic Sections
OBJ: 10-6.2 Identifying Translated Conic Sections STA: CA A2 17.0
TOP: 10-6 Example 4
KEY: conic sections | equation of a parabola | completing the square | translation | vertex of a parabola

33. ANS:



PTS: 1 DIF: L3 REF: 8-2 Properties of Exponential Functions
OBJ: 8-2.1 Comparing Graphs STA: CA A2 12.0 TOP: 8-2 Example 1
KEY: exponential function | graphing

34. ANS:

$$\log_7 n - \log_7 2$$

PTS: 1

DIF: L3

REF: 8-4 Properties of Logarithms

OBJ: 8-4.1 Using the Properties of Logarithms

STA: CA A2 11.0 | CA A2 14.0

TOP: 8-4 Example 3

KEY: properties of logarithms | expanding logarithms | Quotient Property of Logarithms

35. ANS:

$$\frac{q + 8}{q - 8}; q \neq -3, q \neq 8$$

PTS: 1

DIF: L2

REF: 9-4 Rational Expressions

OBJ: 9-4.1 Simplifying Rational Expressions

STA: CA A2 7.0

TOP: 9-4 Example 1

KEY: rational expression | simplifying a rational expression | restrictions on a variable

36. ANS:

0.04

PTS: 1

DIF: L3

REF: 8-5 Exponential and Logarithmic Equations

OBJ: 8-5.2 Solving Logarithmic Equations

STA: CA A2 11.0 | CA A2 11.1 | CA A2 13.0

TOP: 8-5 Example 7

KEY: logarithmic equation | properties of logarithms

37. ANS:

 $\frac{2}{5}$

PTS: 1

38. ANS:

$$25g^{26}h^{20}$$

PTS: 1

DIF: L3

REF: 7-4 More Multiplication Properties of Exponents

OBJ: 7-4.2 Raising a Product to a Power STA: CA A1 2.0 | CA A1 10.0

TOP: 7-4 Example 4

KEY: exponential expression | raising a product to a power | simplifying an exponential expression

39. ANS:

 $\frac{2}{5}$

PTS: 1

40. ANS:

$$\frac{(x - 4)^2}{(x + 3)(x + 1)}; x \neq -4, -3, -2, -1, 4$$

PTS: 1

DIF: L3

REF: 9-4 Rational Expressions

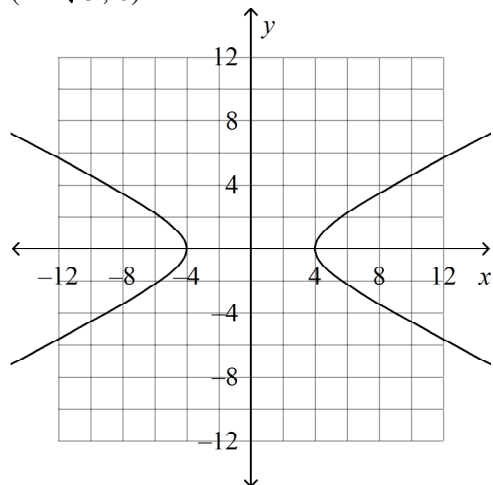
OBJ: 9-4.2 Multiplying and Dividing Rational Expressions

STA: CA A2 7.0

TOP: 9-4 Example 4

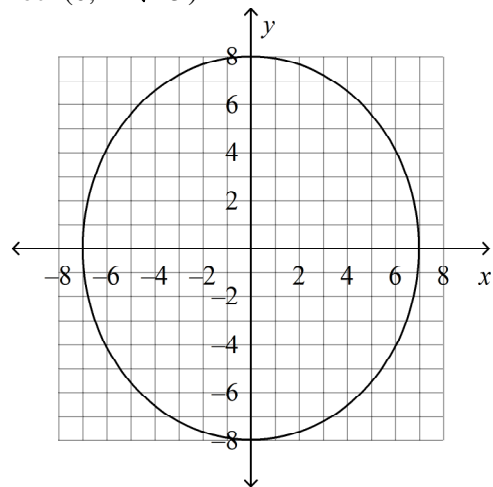
KEY: restrictions on a variable | dividing rational expressions

41. ANS:
 $(\pm 2\sqrt{5}, 0)$



- PTS: 1 DIF: L2 REF: 10-5 Hyperbolas
 OBJ: 10-5.2 Using the Foci of a Hyperbola STA: CA A2 16.0
 TOP: 10-5 Example 2
 KEY: asymptotes of a hyperbola | equation of a hyperbola | graphing | hyperbola | transverse axis of a hyperbola | vertices of a hyperbola | foci of a hyperbola

42. ANS:
 foci $(0, \pm \sqrt{15})$



- PTS: 1 DIF: L2 REF: 10-4 Ellipses
 OBJ: 10-4.2 Finding and Using the Foci of an Ellipse STA: CA A2 16.0
 TOP: 10-4 Example 3
 KEY: co-vertex of an ellipse | ellipse | equation of an ellipse | graphing | foci of an ellipse | major axis of an ellipse | minor axis of an ellipse
43. ANS:
 great

PTS: 1

44. ANS:
 $\frac{2}{5}$

PTS: 1

45. ANS:
 $\frac{2}{5}$

PTS: 1

46. ANS:
-9

PTS: 1

DIF: L2

REF: 9-6 Solving Rational Equations

OBJ: 9-6.1 Solving Rational Equations

STA: CA A2 7.0 TOP: 9-6 Example 2

KEY: rational equation | no solutions

47. ANS:
great

PTS: 1

48. ANS:
 $\frac{2}{5}$

PTS: 1