

Preview Algebra 2 Midterm Review questions with answers.

2B Midterm Review Answer Key

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#

Question

Correct Response

An initial population of 895 quail increases at an annual rate of 7%. Which exponential function models the quail population?

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

B. $f(x) = 895(7)^x$

C. $f(x) = 895(0.07)^x$

D. $f(x) = (895 \cdot 0.07)^x$

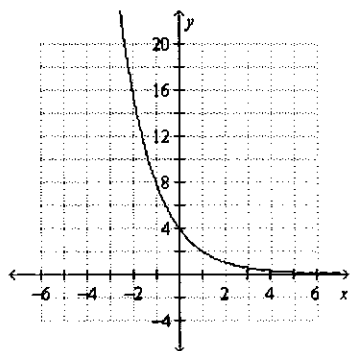
$895(1 + .07)^x$

A

1

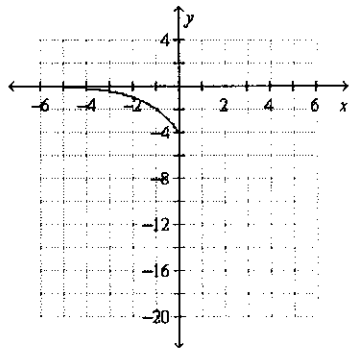
Match the exponential function to its graph. $y = 4(2)^x$

A.



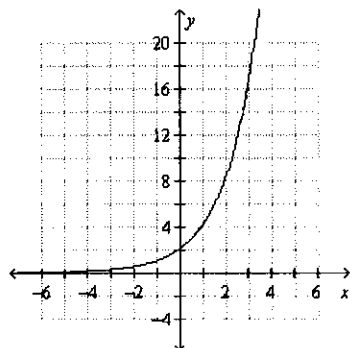
2

B.

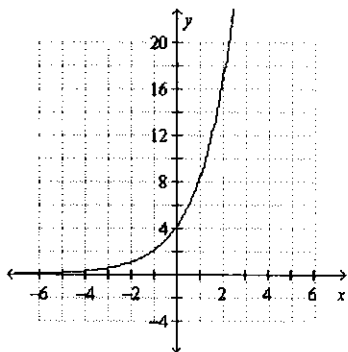


D

C.

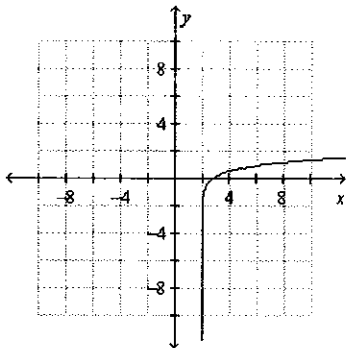


D.



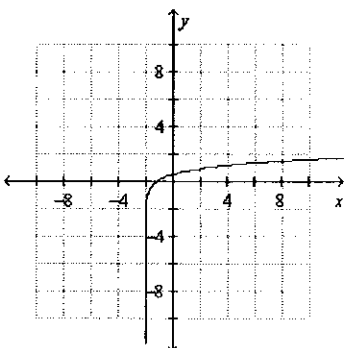
What is the graph of the logarithmic equation? $y = \log_5(x - 2)$

A.



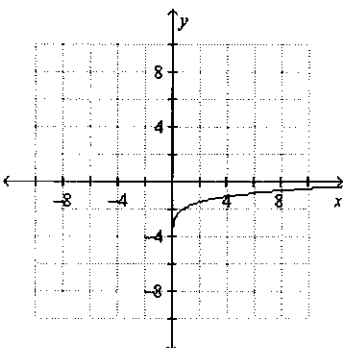
3

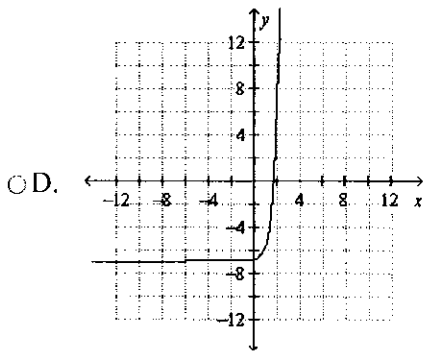
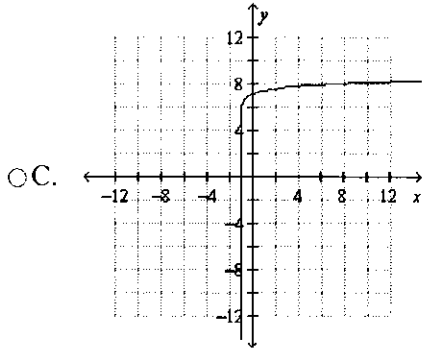
B.



A

C.





6. What is the expression written as a single logarithm? $\log_3 4 - \log_3 2$
- A. $\log_3 2$
- B. $\log_3 8$
- C. $\log 2$
- D. $\log 8$

$\log_3 2$

$\begin{matrix} \uparrow & \uparrow \\ 4 & \div 2 \end{matrix}$

$$X^2 \cdot X^3 = X^5$$

$$\frac{X^4}{X^2} = X^2$$

(A)

7. What is the expression written as a single logarithm? $5 \log_b q + 2 \log_b y$
- A. $\log_b(q^5 y^2)$
- B. $(5 + 2) \log_b(q + y)$
- C. $\log_b(q^5 + y^2)$
- D. $\log_b(qy^{5+2})$

$$\log_b q^5 + \log_b y^2$$

$$\log_b q^5 \cdot y^2$$

(A)

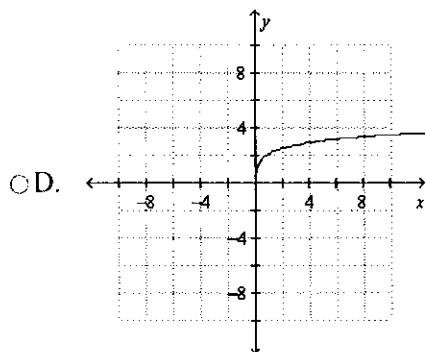
8. Solve. $\log_{10}(4x + 10) = 3$ *← exponent*
- A. $-\frac{7}{4}$ *← Base*
- B. $\frac{495}{2}$
- C. 250
- D. 990

$$10^3 = 4x + 10$$

$$1000 = 4x + 10$$

$$\begin{array}{r} 1000 \\ -10 \\ \hline 990 = 4x \\ \frac{990}{4} \end{array}$$

(B)

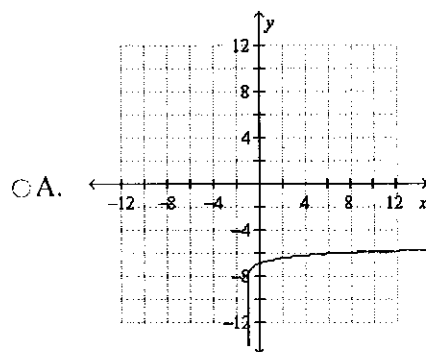


Evaluate the logarithm. $\log_5 \frac{1}{625}$

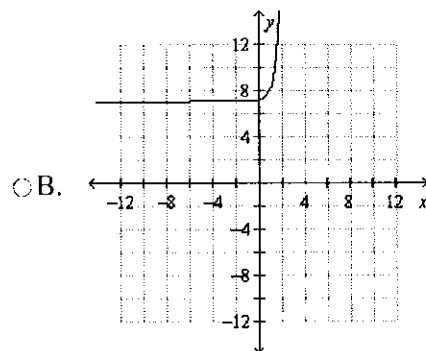
- 4
- A. -3
 - B. 5
 - C. -4
 - D. 4

C

What is the graph of the logarithmic equation? $y = \log(x + 1) - 7$



5



A

Solve. $\frac{1}{16} = 64^{4x-3}$

A. $\frac{1}{12}$

B. $\frac{1}{4}$

C. $\frac{7}{12}$

D. $\frac{11}{12}$

$\log_{64} \frac{1}{16} = 4x - 3$

$-\frac{2}{3} = 4x - 3$

C

9

Solve. $125^{9x-2} = 150$

A. -1.8847

B. -0.1069

C. 0.3375

D. 1.0378

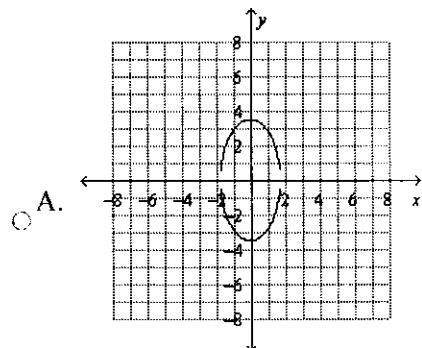
$\log_{125} 150 = 9x - 2$

$\log(150) \div \log(125)$

C

10

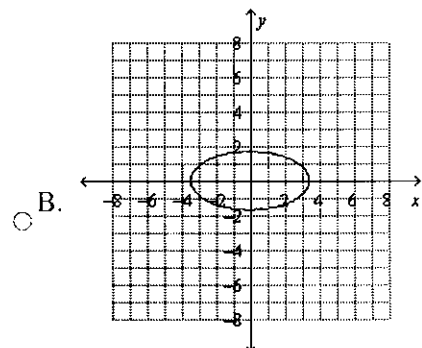
Choose the graph of the equation. Describe the graph and its lines of symmetry. $16x^2 + 4y^2 = 49$



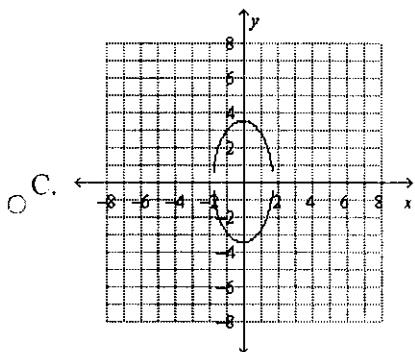
The graph is an ellipse. The center is at the origin. It has two lines of symmetry, the x-axis and the y-axis.

A

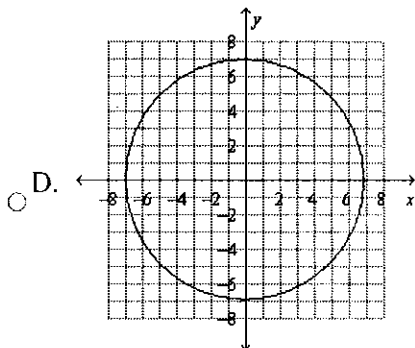
11



The graph is an ellipse. The center is at the origin. It has two lines of symmetry, the x-axis and the y-axis.

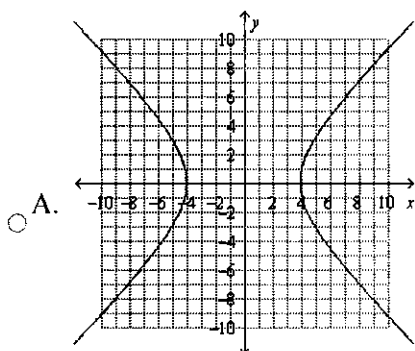


The graph is a circle. The center is at the origin. Every line through the origin is a line of symmetry.



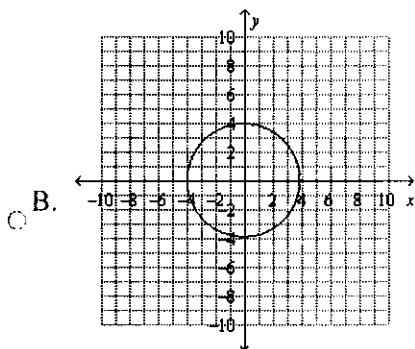
The graph is a circle. The center is at the origin. Every line through the origin is a line of symmetry.

Choose the graph of the equation. Describe the graph and its lines of symmetry. $x^2 - y^2 = 16$



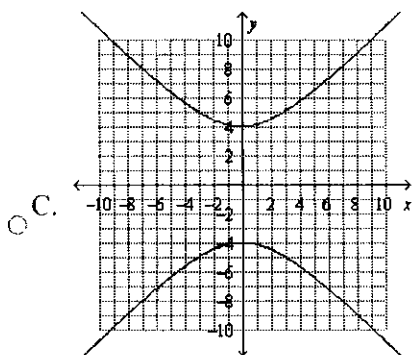
The graph is a hyperbola that consists of two branches. Its center is at the origin. It has four lines of symmetry, the x-axis, the y-axis, $y = x$, and $y = -x$.

12

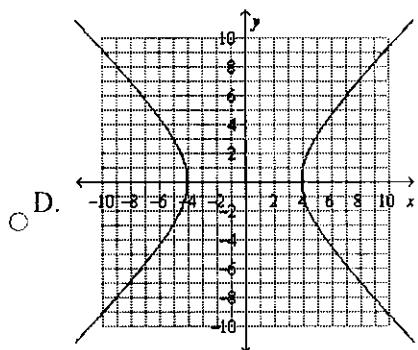


The graph is a circle with radius 4. Its center is at the origin. Every line through the center is a line of symmetry.

D



The graph is a hyperbola that consists of two branches. Its center is at the origin. It has four lines of symmetry, the x -axis, the y -axis, $y = x$, and $y = -x$.



The graph is a hyperbola that consists of two branches. Its center is at the origin. It has two lines of symmetry, the x -axis and the y -axis.

What is the equation of a parabola with a vertex at the origin and a focus at $(-2, 0)$?

- A. $x = -\frac{1}{8}y^2$
- B. $y = -\frac{1}{4}x^2$
- C. $y = \frac{1}{8}x^2$
- D. $x = \frac{1}{8}y^2$

A

Identify the focus and the directrix of the graph of the equation.

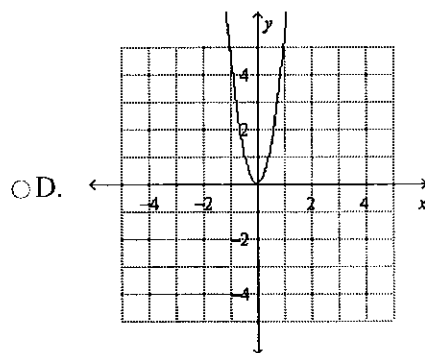
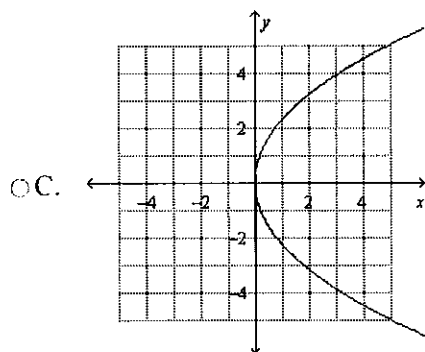
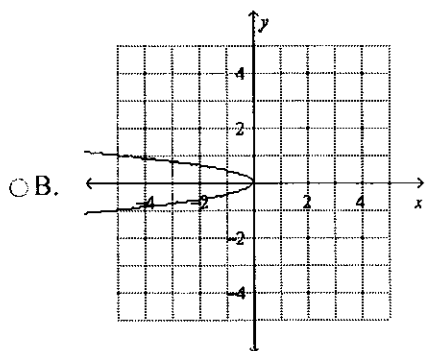
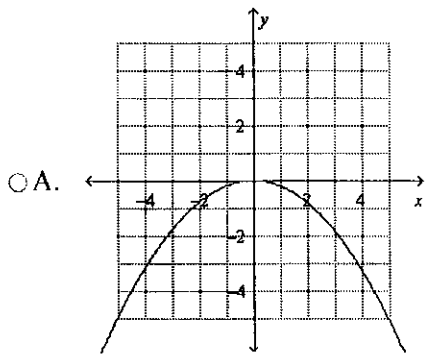
$$y = -\frac{1}{12}x^2$$

- A. focus $(0, -3)$, directrix at $y = -3$
- B. focus $(-3, 0)$, directrix at $y = -3$
- C. focus $(0, -3)$, directrix at $y = 3$
- D. focus $(-3, 0)$, directrix at $y = 3$

C

- 15 What is the graph of the equation? $x = \frac{1}{5}y^2$

C



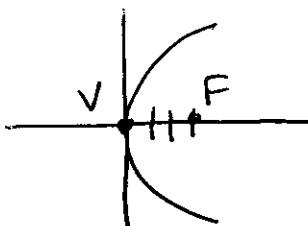
Which is the equation of the parabola that has a vertex at the origin and a focus at (3, 0)?

16

A. $y = \frac{1}{12}x^2$

B. $y = -\frac{1}{12}x^2$

C. $x = -\frac{1}{12}y^2$



D

D. $x = \frac{1}{12}y^2$

Write an equation for the circle. radius 7, centered at the origin

- 17 A. $x^2 + y^2 = 14$
- B. $x^2 + y^2 = 49$
- C. $x^2 - y^2 = 49$
- D. $y^2 - x^2 = 14$

B

What is the equation of a circle with center $(-5, -8)$ and radius 2?

- 18 A. $(x - 5)^2 + (y - 8)^2 = 2$
- B. $(x + 5)^2 + (y + 8)^2 = 4$
- C. $(x - 5)^2 + (y - 8)^2 = 4$
- D. $(x + 5)^2 + (y + 8)^2 = 2$

B

Find the center and radius of the circle with the equation?

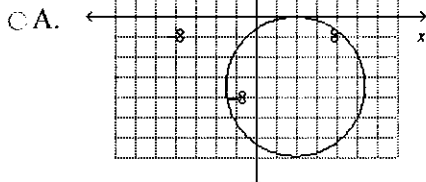
$$(x - 5)^2 + (y + 6)^2 = 9$$

- 19 A. $(5, -6); 3$
- B. $(-5, 6); 9$
- C. $(5, -6); 9$
- D. $(-5, 6); 3$

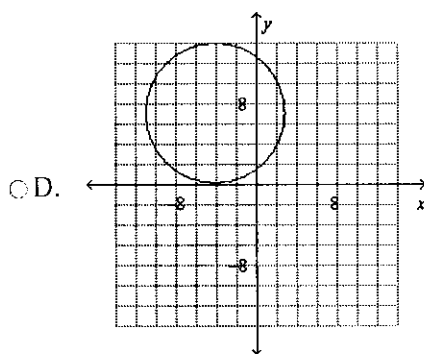
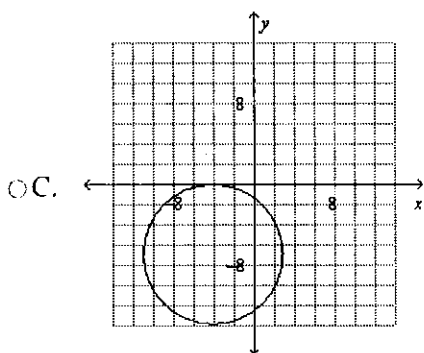
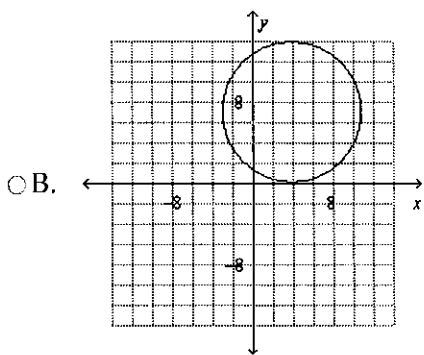
A

What is the graph of the equation? $(x + 4)^2 + (y - 7)^2 = 49$

20



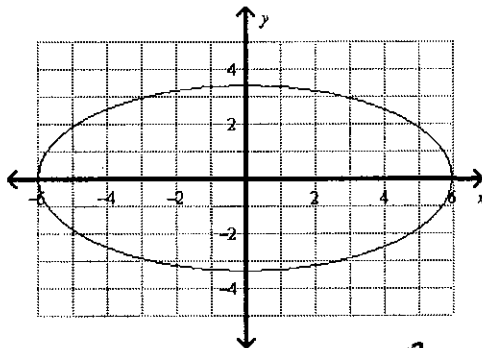
D



Find the foci of the ellipse with the equation given. $18x^2 + 36y^2 = 648$
 Choose the graph of the ellipse.

21

A.



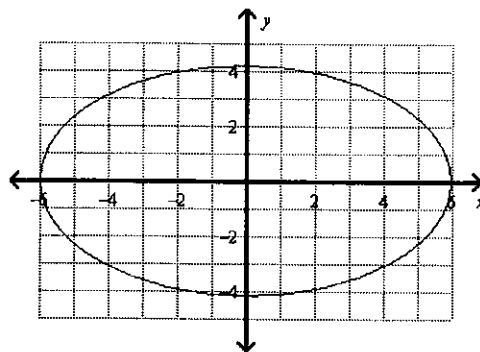
foci $(0, \pm 2\sqrt{3})$

B

$$\frac{18x^2}{648} + \frac{36y^2}{648} = \frac{648}{648}$$

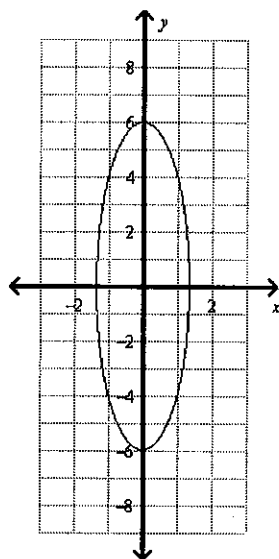
$$\frac{x^2}{36} + \frac{y^2}{18} = 1$$

Ⓒ B.



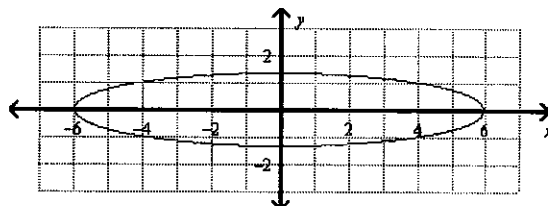
foci $(\pm 3\sqrt{2}, 0)$

Ⓒ C.



foci $(0, \pm \sqrt{2})$

Ⓒ D.



foci $(\pm \sqrt{2}, 0)$

What is the equation in standard form of an ellipse that has a height of 12 units, width of 19 units, and is centered at the origin?

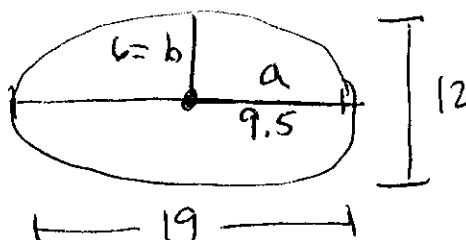
Ⓒ A. $\frac{x^2}{144} + \frac{y^2}{361} = 1$

22

Ⓒ B. $\frac{x^2}{90.25} + \frac{y^2}{36} = 1$

Ⓒ C. $\frac{x^2}{361} + \frac{y^2}{144} = 1$

Ⓒ D. $\frac{x^2}{36} + \frac{y^2}{90.25} = 1$



Ⓒ B

23

What is the equation in standard form of an ellipse that has a vertex at (5, 0), a co-vertex at (0, -3), and is centered at the origin?

Ⓒ A. $\frac{x^2}{3} + \frac{y^2}{5} = 1$

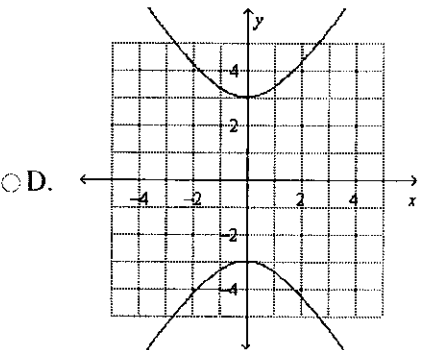
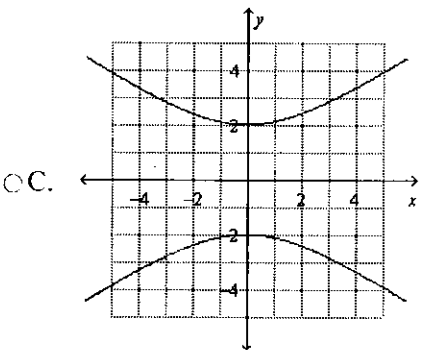
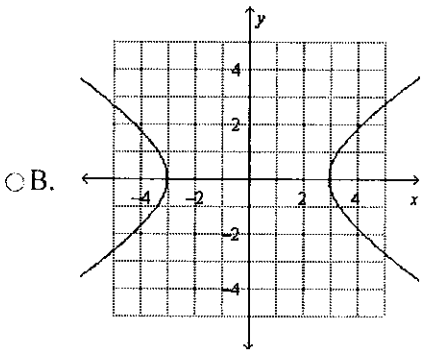
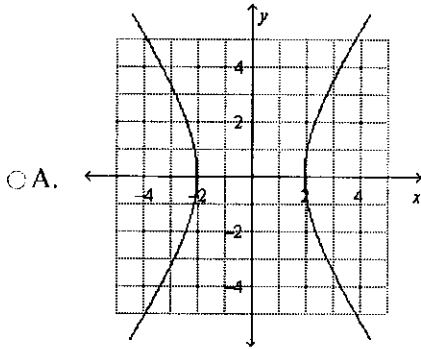
Ⓒ C

B. $\frac{x^2}{9} + \frac{y^2}{25} = 1$

C. $\frac{x^2}{25} + \frac{y^2}{9} = 1$

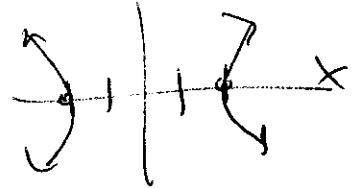
D. $\frac{x^2}{5} + \frac{y^2}{3} = 1$

What is the graph of the conic section? $9x^2 - 4y^2 = 36$



$$\frac{9x^2}{36} - \frac{4y^2}{36} = \frac{36}{36}$$

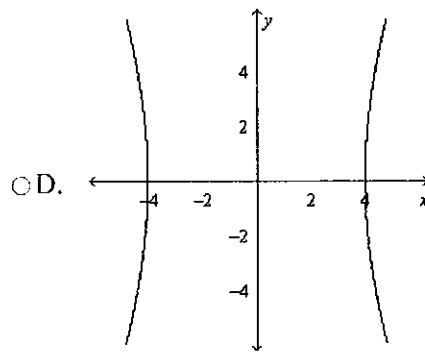
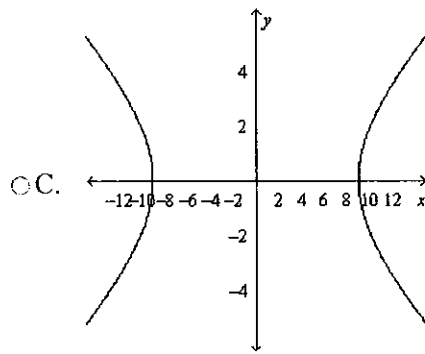
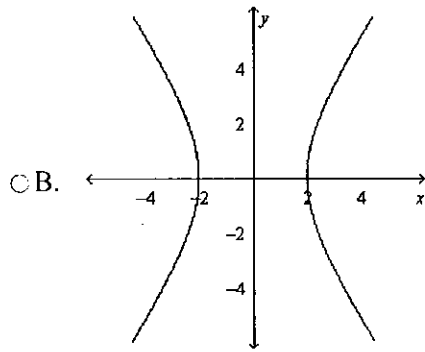
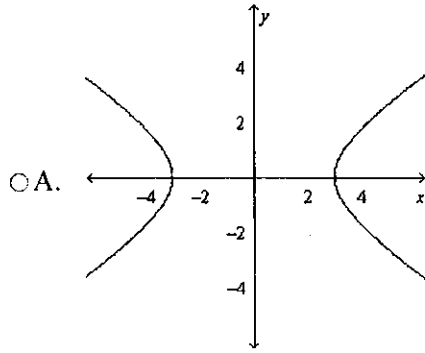
$$\frac{x^2}{4} - \frac{y^2}{9} = 1$$



A

24

What is the graph of the equation? $4x^2 - 9y^2 = 36$



25

A

Is the relationship between the variables in the table a direct variation, an inverse variation, or neither? If it is a direct or inverse variation, choose the function that models it.

x | -8 | -6 | -5 | -1

26

A

$y \begin{matrix} | & 15 & | & 5 & | & 6 & | & 30 \end{matrix}$

- A. inverse variation; $y = \frac{-30}{x}$
- B. direct variation; $y = -30x$
- C. neither

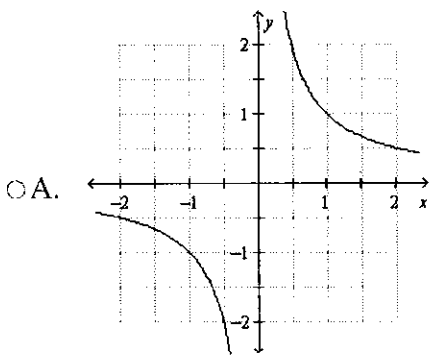
The amount of oil used by a ship traveling at a uniform speed varies jointly with the distance and the square of the speed. The ship uses 28 barrels of oil in traveling 90 miles at 56 mi/h. How many barrels of oil are used when the ship travels 31 miles at 26 mi/h? Round your answer to the nearest whole number.

- 27
- A. 10 barrels
 - B. 4 barrels
 - C. 6 barrels
 - D. 2 barrels

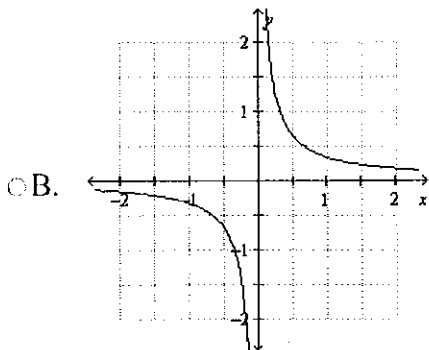
D

Sketch the graph of the equation. $y = \frac{1}{3x}$

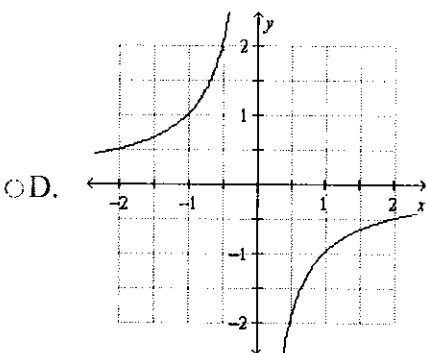
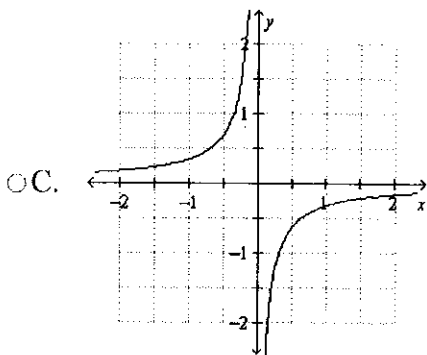
y = 1 / (3x)



28



B



Describe the vertical asymptote(s) and hole(s) for the graph of the

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

function.

- 29
- A. asymptote: $x = -4$ and hole: $x = 2$
 - B. asymptotes: $x = -4$ and $x = 2$
 - C. asymptote: $x = -5$ and hole: $x = -4$
 - D. asymptote: $x = 4$ and hole: $x = -2$

A

Find the natural domain of the function. $f(x) = \frac{3}{x-2} + 9$

- 30
- A. all real numbers other than 3
 - B. all real numbers other than -2
 - C. all real numbers other than 2
 - D. all real numbers other than -3

C

Find any points of discontinuity for the rational function.

$$y = \frac{(x + 6)(x + 2)(x + 8)}{(x + 9)(x + 7)}$$

- 31
- A. $x = 6, x = 2, x = 8$
 - B. $x = 9, x = 7$
 - C. $x = -9, x = -7$
 - D. $x = -6, x = -2, x = -8$

C

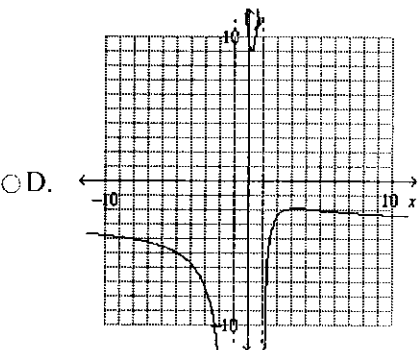
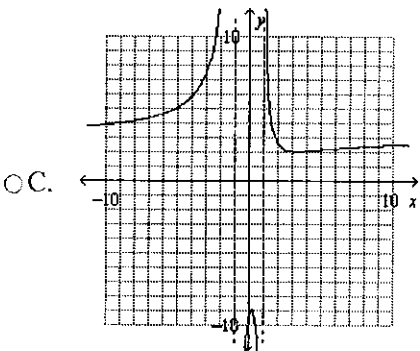
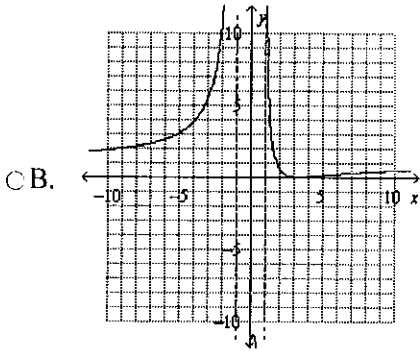
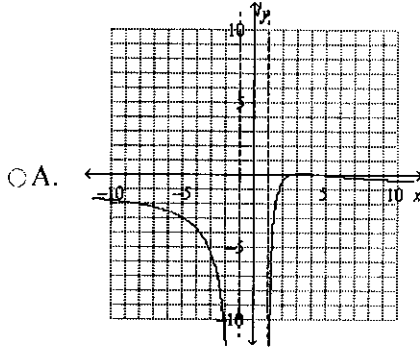
Which image correctly displays the asymptotes and graph of the

function? $y = \frac{x^2 - 7x + 12}{x^2 - 1}$

$$Y = (x^2 - 7x + 12) / (x^2 - 1)$$

$$Y = \frac{(x-3)(x-4)}{(x+1)(x-1)}$$

V.A. $x = -1$ $x = 1$



B

32

Factor the polynomial. $2x^2 + 23x + 45$

- A. $(2x + 9)(x - 5)$
 B. $(2x + 5)(x + 9)$

B

C. $(2x + 5)(x - 9)$

D. $(x + 5)(2x + 9)$

Divide. State any restrictions on the variable. $\frac{x^2 - 16}{x^2 + 5x + 6} \div \frac{x^2 + 5x + 4}{x^2 - 2x - 8}$

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

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

C

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

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

Simplify the expression. State any restrictions on the variable.

$$\frac{p^2 - 4p - 32}{p + 4}$$

35 A. $-p + 8$; $p \neq -4$

B. $p - 8$; $p \neq -4$

C. $-p - 8$; $p \neq 4$

D. $p + 8$; $p \neq 4$

B

Simplify the complex fraction. $\frac{\frac{4}{x+3}}{\frac{1}{x} + 3}$

36 A. $\frac{12x + 4}{x^2 + 3x}$

B. $\frac{4x}{3x + 9}$

C. $\frac{4x}{3x^2 + 10x + 3}$

D. not here

C

Add. Simplify if possible. $\frac{w^2 + 2w - 24}{w^2 + w - 30} + \frac{8}{w - 5}$

37 A. $\frac{w - 4}{w - 5}$

D

- B. $\frac{w^2 + 2w - 16}{w^2 + w - 30}$
- C. $w + 4$
- D. $\frac{w + 4}{w - 5}$

$$\frac{x + \frac{4x}{y}}{\frac{7}{3x}}$$

Simplify the complex fraction.

- A. $\frac{15x^2}{7y}$
- 38 B. $\frac{7x(y + 4)}{3xy}$
- C. $\frac{3x^2(y + 4)}{7y}$
- D. $\frac{3(y + 4)}{7y}$

C

Solve the equation. Check the solution. $\frac{6}{x^2 - 9} - \frac{1}{x - 3} = 1$

- A. -4
- 39 B. 2
- C. $\frac{-1 \pm \sqrt{73}}{2}$
- D. 3 or -4

A