

33

Algebra 2B Midterm Review

Name: _____

Date: _____

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

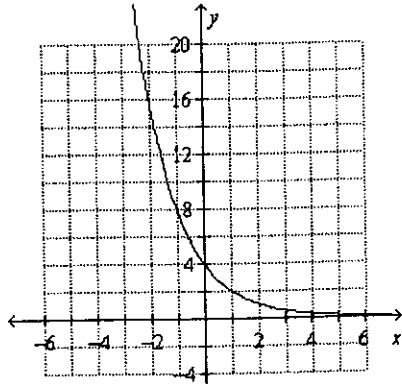
- A $f(x) = 895(1.07)^x$
- B $f(x) = 895(7)^x$
- C $f(x) = 895(0.07)^x$
- D $f(x) = (895 \cdot 0.07)^x$

Algebra 2A Midterm Review

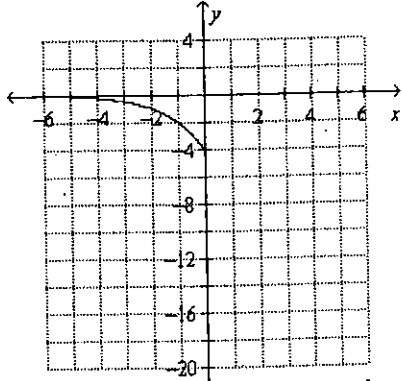
2 Match the exponential function to its graph.

$$y = 4(2)^x$$

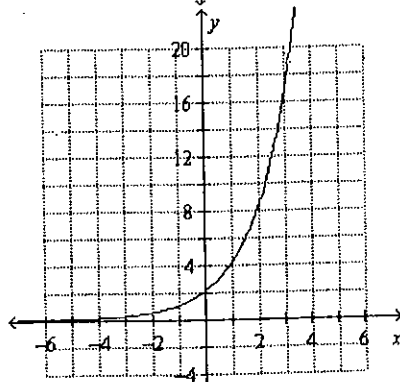
A



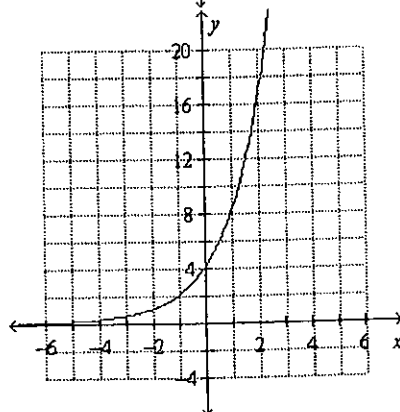
B



C



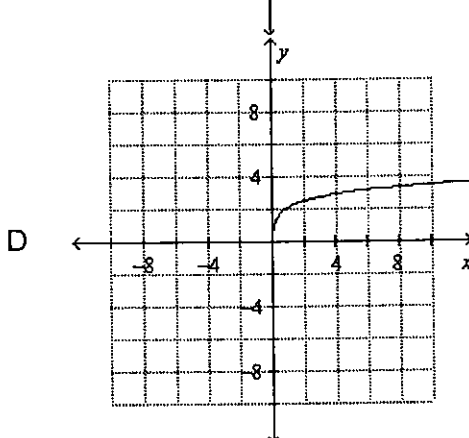
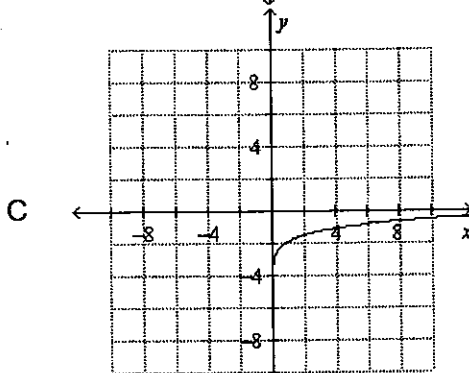
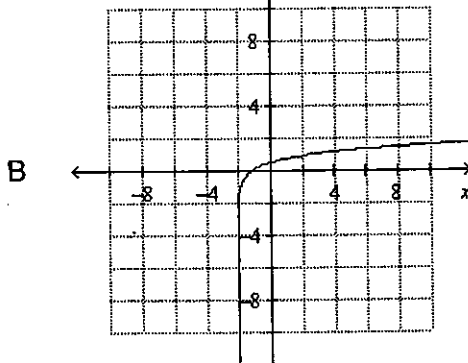
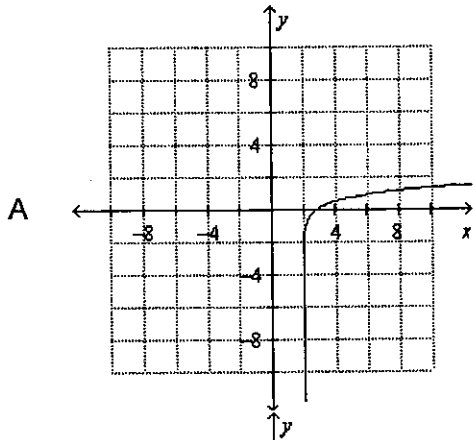
D



Algebra 2A Midterm Review

3 What is the graph of the logarithmic equation?

$$y = \log_5(x - 2)$$



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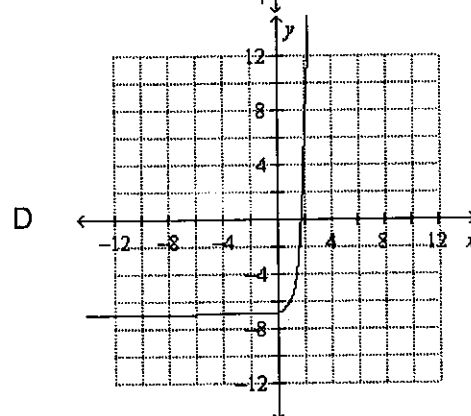
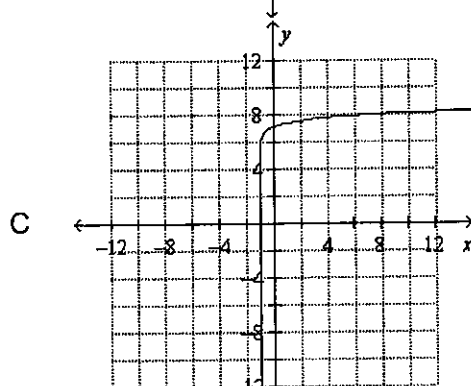
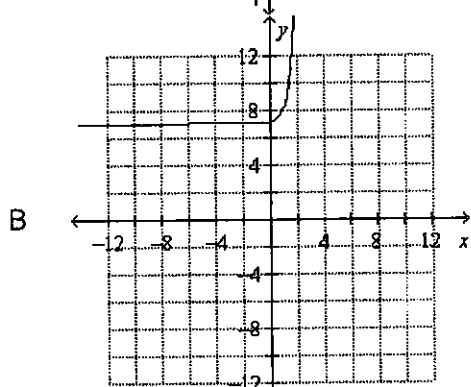
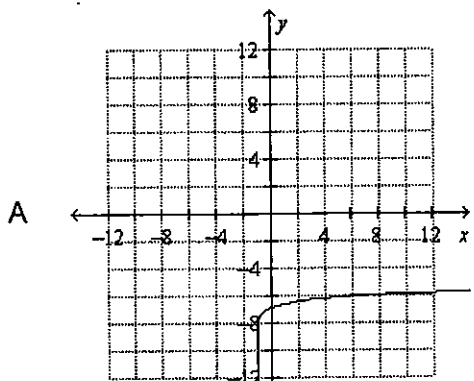
4 Evaluate the logarithm.

$$\log_5 \frac{1}{625}$$

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

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



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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 $\log 8$

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 $\log_b (qy^{5+2})$

8 Solve.

$$\log(4x + 10) = 3$$

- A $-\frac{7}{4}$
- B $\frac{495}{2}$
- C 250
- D 990

9 Solve.

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

- A $\frac{1}{12}$
- B $\frac{1}{4}$
- C $\frac{7}{12}$
- D $\frac{11}{12}$

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10 Solve.

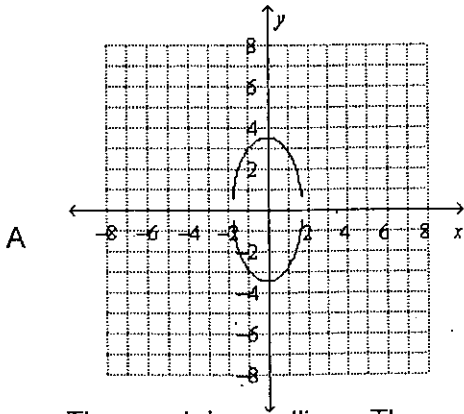
$$125^{9x-2} = 150$$

- A -1.8847
- B -0.1069
- C 0.3375
- D 1.0378

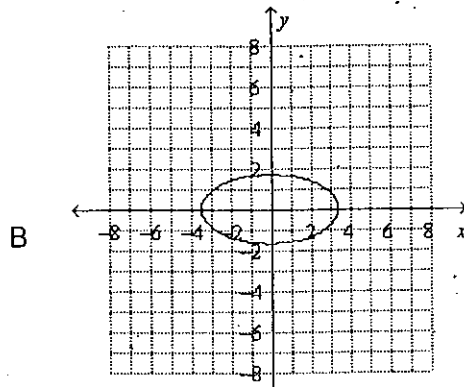
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11 Choose the graph of the equation. Describe the graph and its lines of symmetry.

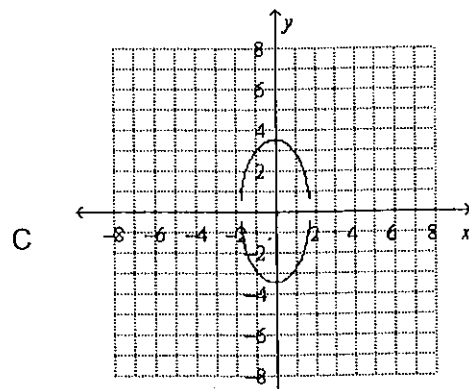
$$16x^2 + 4y^2 = 49$$



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

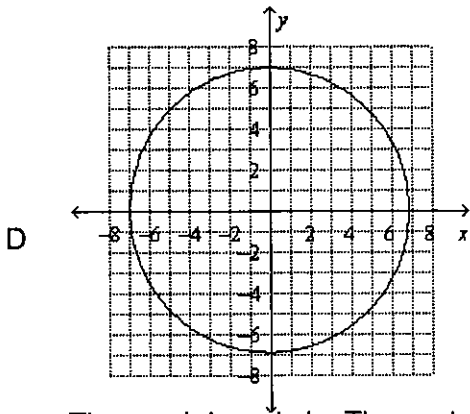


The graph is an ellipse. The center is at the origin. It has two lines of symmetry, the x-axis and the y-axis.



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

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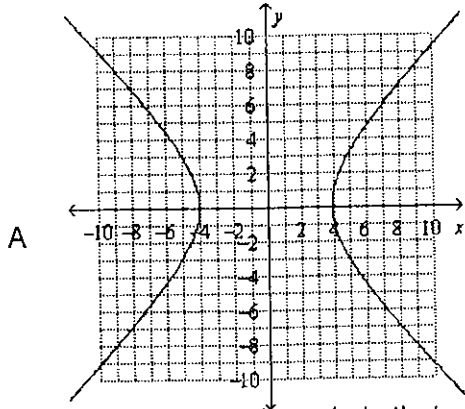


The graph is a circle. The center is at the origin. Every line through the origin is a line of symmetry.

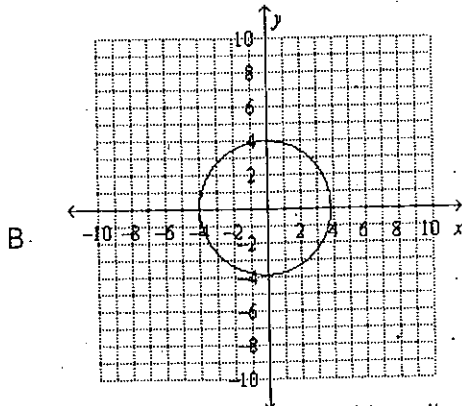
Algebra 2A Midterm Review

- 12 Choose the graph of the equation. Describe the graph and its lines of symmetry.

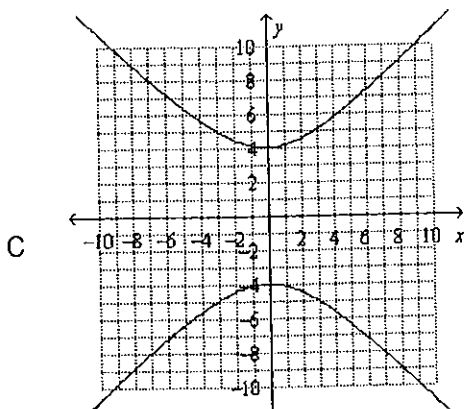
$$x^2 - y^2 = 16$$



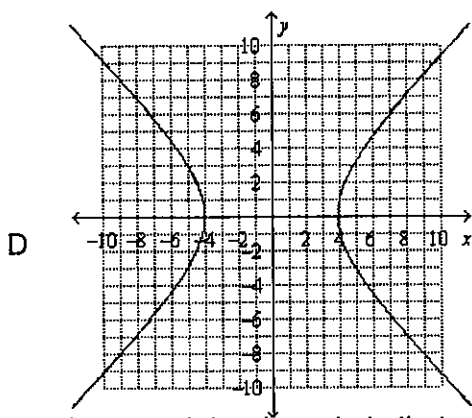
The graph is a hyperbola that consists of two branches. Its center is at the origin. It has four lines of symmetry, the x -axis, the y -axis, $y = x$, and $y = -x$.



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



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.

13 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 $x = \frac{1}{8}y^2$

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

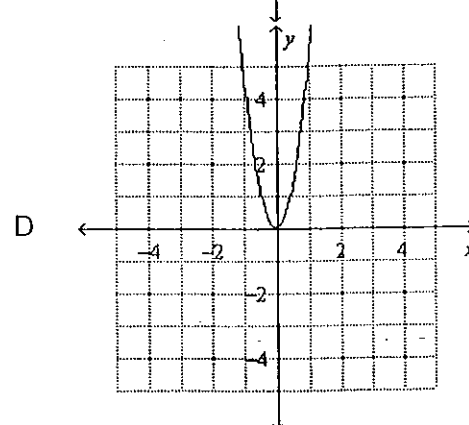
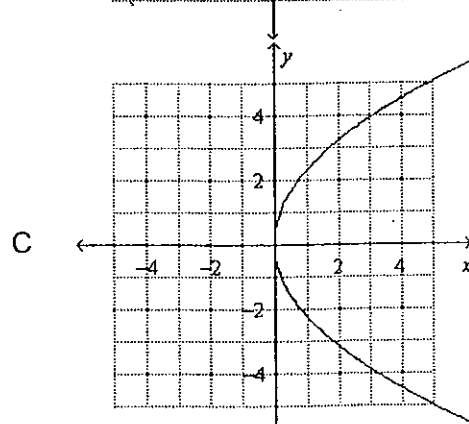
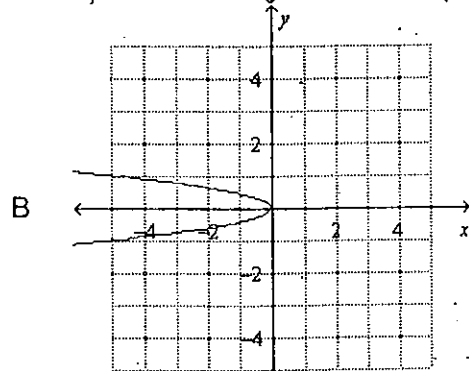
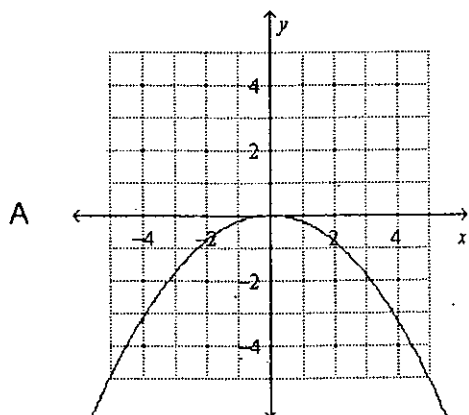
$$y = -\frac{1}{12}x^2$$

- 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 $y = 3$

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15 What is the graph of the equation?

$$x = \frac{1}{5}y^2$$



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

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

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

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

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

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

A $x^2 + y^2 = 14$

B $x^2 + y^2 = 49$

C $x^2 - y^2 = 49$

D $y^2 - x^2 = 14$

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

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 $(x + 5)^2 + (y + 8)^2 = 2$

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

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

A (5, -6); 3

B (-5, 6); 9

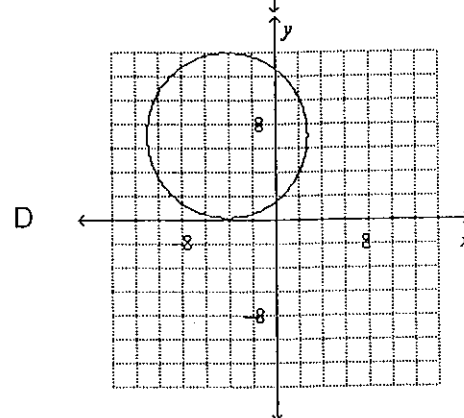
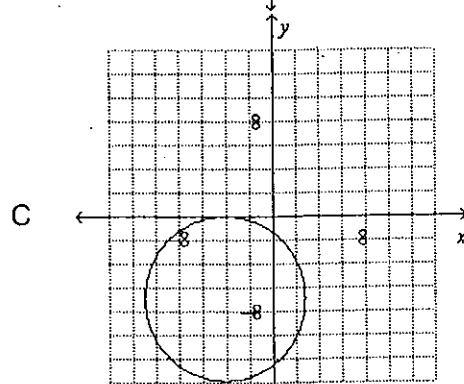
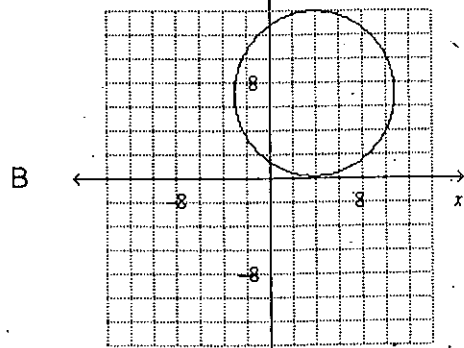
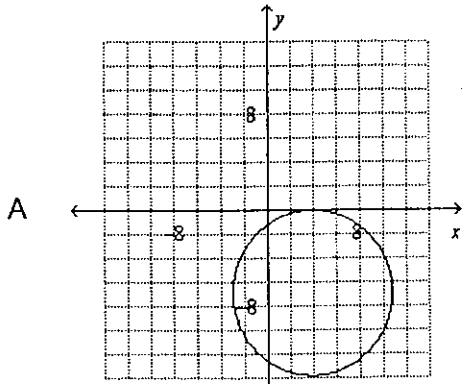
C (5, -6); 9

D (-5, 6); 3

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20 What is the graph of the equation?

$$(x + 4)^2 + (y - 7)^2 = 49$$

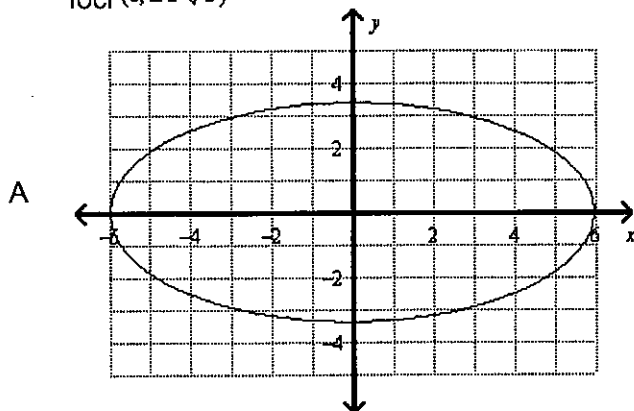


21 Find the foci of the ellipse with the equation given.

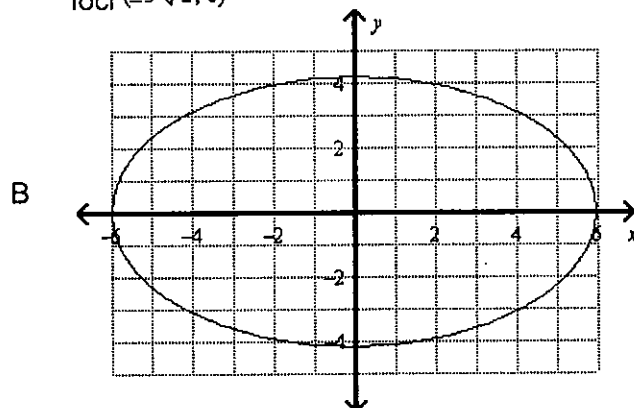
$$18x^2 + 36y^2 = 648$$

Choose the graph of the ellipse.

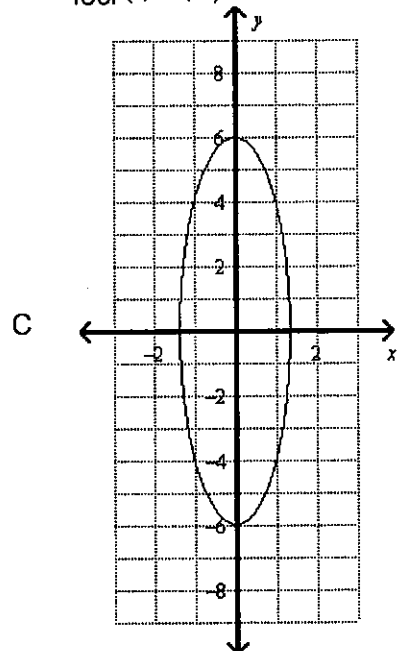
foci $(0, \pm 2\sqrt{3})$



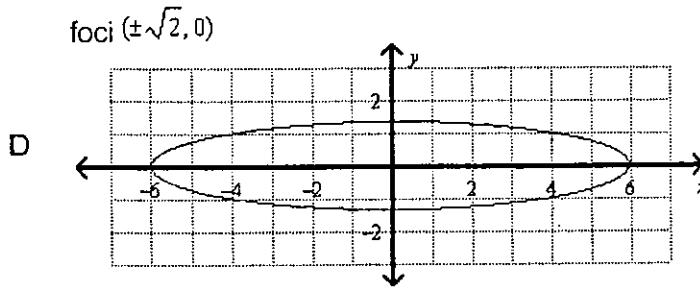
foci $(\pm 3\sqrt{2}, 0)$



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



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- 22 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 $\frac{x^2}{144} + \frac{y^2}{361} = 1$

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

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

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

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

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

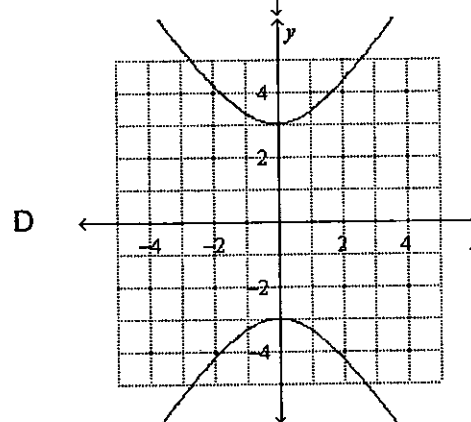
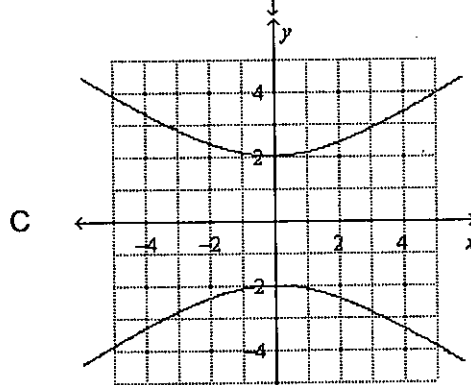
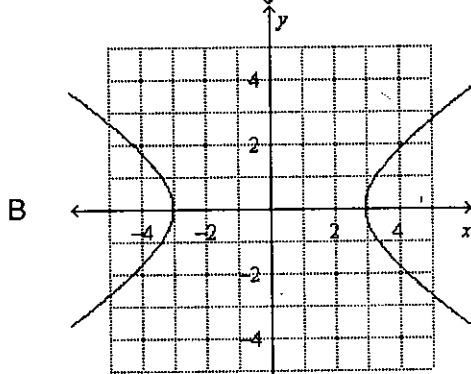
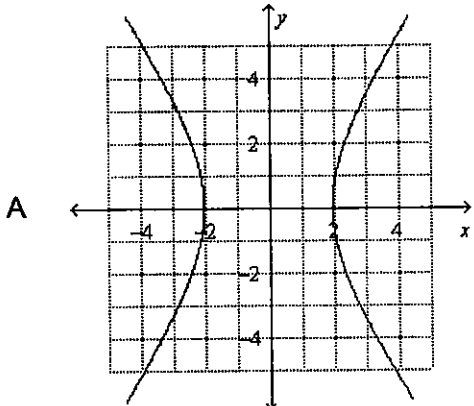
C $\frac{x^2}{25} + \frac{y^2}{9} = 1$

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

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24 What is the graph of the conic section?

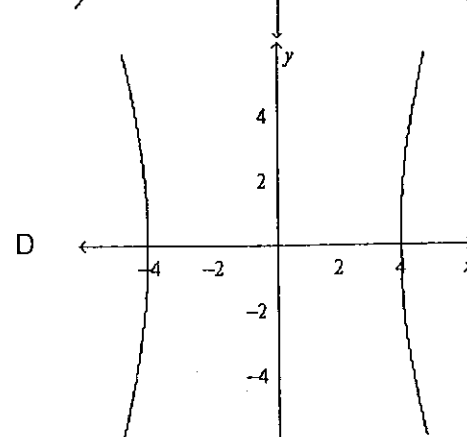
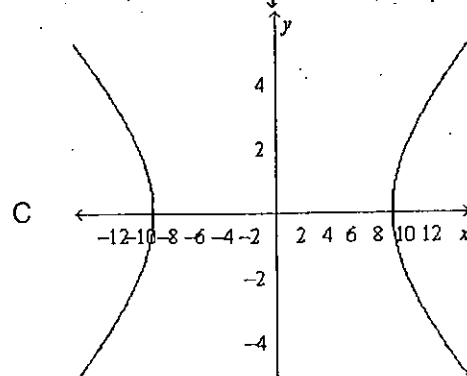
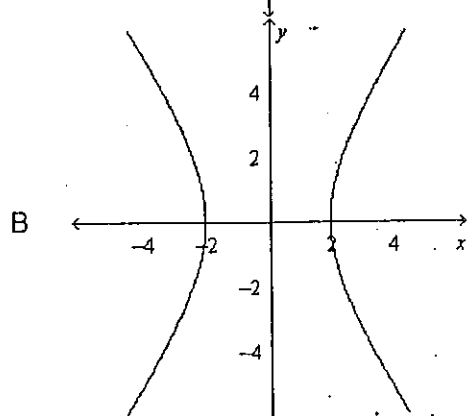
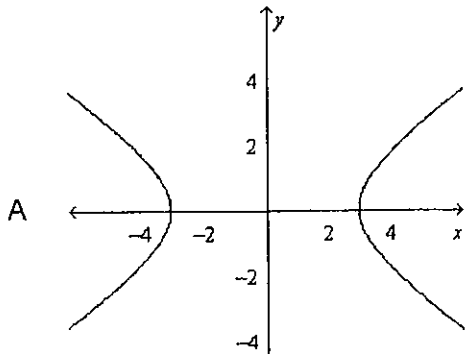
$$9x^2 - 4y^2 = 36$$



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25 What is the graph of the equation?

$$4x^2 - 9y^2 = 36$$



- 26 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.

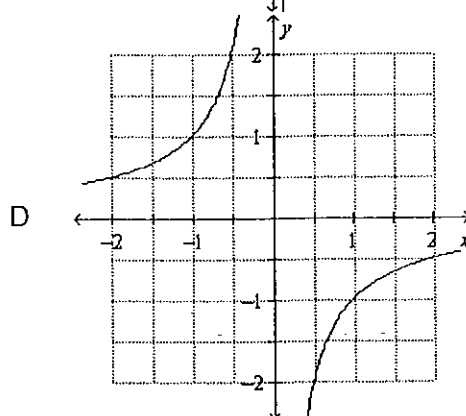
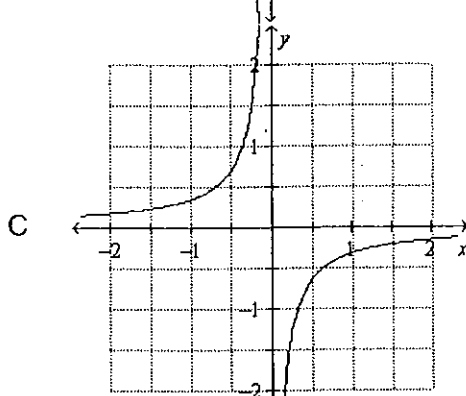
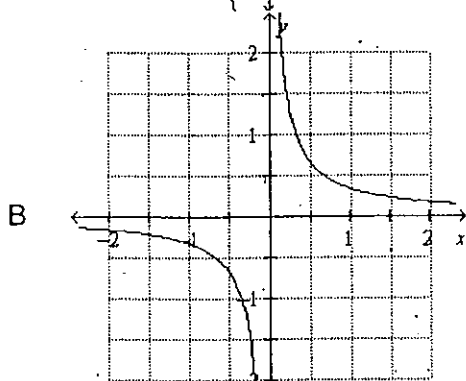
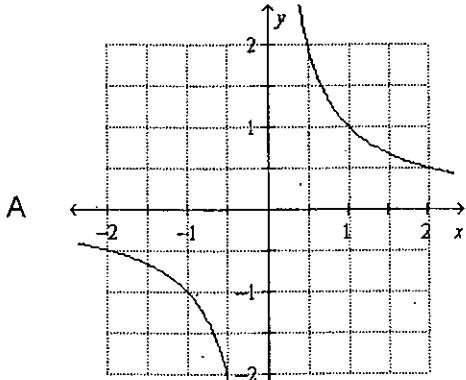
x	-8	-6	-5	-1
y	$\frac{15}{4}$	5	6	30

- A inverse variation; $y = \frac{-30}{x}$
 B direct variation; $y = -30x$
 C neither
- 27 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.
- A 10 barrels
 B 4 barrels
 C 6 barrels
 D 2 barrels

Algebra 2A Midterm Review

28 Sketch the graph of the equation.

$$y = \frac{1}{3x}$$



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- 29 Describe the vertical asymptote(s) and hole(s) for the graph of the function.

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

- 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: $x = -2$

- 30 Find the natural domain of the function.

$$f(x) = \frac{3}{x-2} + 9$$

- 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

- 31 Find any points of discontinuity for the rational function.

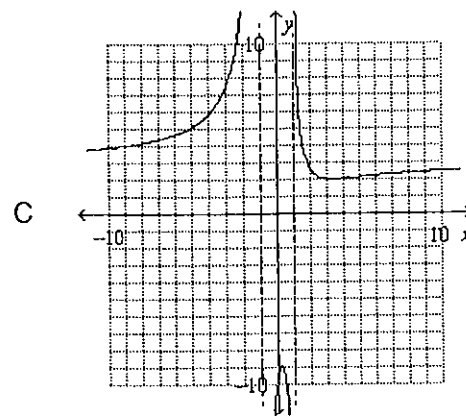
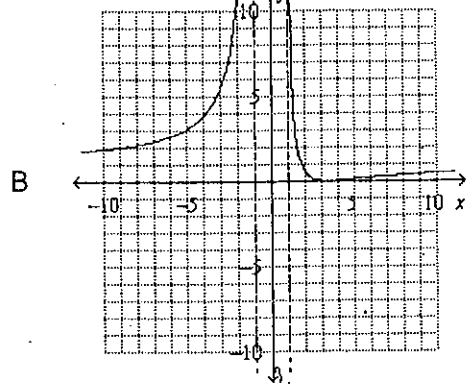
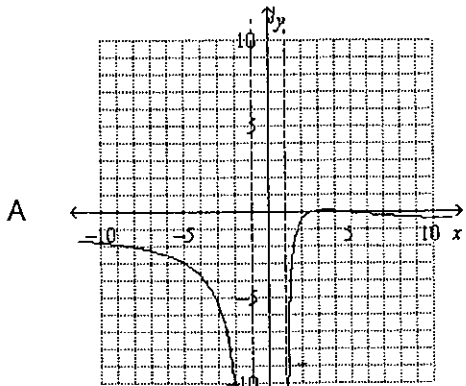
$$y = \frac{(x+6)(x+2)(x+8)}{(x+9)(x+7)}$$

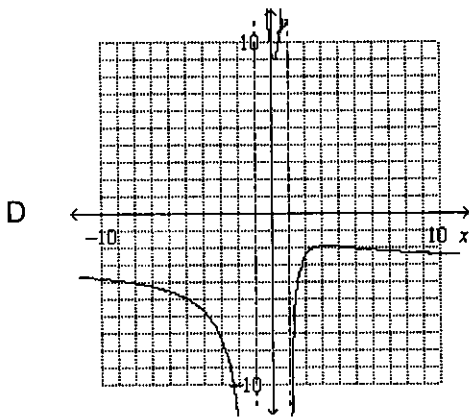
- A $x = 6, x = 2, x = 8$
- B $x = 9, x = 7$
- C $x = -9, x = -7$
- D $x = -6, x = -2, x = -8$

Algebra 2A Midterm Review

32 Which image correctly displays the asymptotes and graph of the function?

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





33 Factor the polynomial.

$$2x^2 + 23x + 45$$

- A $(2x + 9)(x - 5)$
- B $(2x + 5)(x + 9)$
- C $(2x + 5)(x - 9)$
- D $(x + 5)(2x + 9)$

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

35 Simplify the expression. State any restrictions on the variable.

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

- A $-p + 8$; $p \neq -4$
- B $p - 8$; $p \neq -4$
- C $-p - 8$; $p \neq 4$
- D $p + 8$; $p \neq 4$

Algebra 2A Midterm Review

36 Simplify the complex fraction.

$$\frac{\frac{4}{x+3}}{\frac{1}{x}+3}$$

- A $\frac{12x+4}{x^2+3x}$
- B $\frac{4x}{3x+9}$
- C $\frac{4x}{3x^2+10x+3}$
- D not here

37 Add. Simplify if possible.

$$\frac{w^2+2w-24}{w^2+w-30} + \frac{8}{w-5}$$

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

38 Simplify the complex fraction.

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

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

Algebra 2A Midterm Review

39 Solve the equation. Check the solution.

$$\frac{6}{x^2 - 9} - \frac{1}{x - 3} = 1$$

A -4

B 2

C $\frac{-1 \pm \sqrt{73}}{2}$

D 3 or -4