

Algebra 2 Honors Final Exam (Show your work for credit) *Review*

Name _____ Date _____ Period _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Add or subtract terms whenever possible.

1) $y\sqrt[3]{875x} - \sqrt[3]{56xy^3}$

A) $(y + 1)\sqrt[3]{58}$

C) $3y\sqrt[3]{7x}$

B) $y\sqrt[3]{-54xy^3}$

D) $5y\sqrt[3]{7x} - 875\sqrt[3]{7xy^3}$

Multiply or divide as indicated.

2) $\frac{x^2 + 12x + 32}{x^2 + 14x + 48} \div \frac{x^2 + 4x}{x^2 + 13x + 42}$

A) $\frac{x}{x^2 + 14x + 48}$

B) $x + 7$

C) $\frac{x + 7}{x^2 + 6x}$

D) $\frac{x + 7}{x}$

Add or subtract as indicated.

3) $\frac{x - 3}{x^2 + 2x - 48} + \frac{5x + 4}{x^2 + 3x - 40}$

A) $6x + 1$

B) $\frac{6x^2 - 34x - 9}{(x + 8)(x - 6)(x - 5)}$

C) $\frac{6x^2 - 34x - 9}{(x - 8)(x + 6)(x + 5)}$

D) $\frac{6x + 1}{2x^2 + 5x - 88}$

Simplify the complex rational expression.

4)

$$\frac{\frac{1}{x} + 1}{\frac{1}{x} - 1}$$

A) 1

B) $1 - x^2$

C) $\frac{1 + x}{1 - x}$

D) $\frac{x}{1 - x^2}$

Solve the radical equation, and check all proposed solutions.

5) $x - \sqrt{3x - 2} = 4$

A) {9}

B) {-1}

C) {1, 2}

D) {2, 9}

Solve and check the equation.

6) $(x^2 + 6x + 9)^{3/4} - 13 = 14$

A) {6}

B) {27}

C) {-12, 0, 6}

D) {-12, 6}

Write the standard form of the equation of the circle with the given center and radius.

7) $(3, -8); 11$

A) $(x - 3)^2 + (y + 8)^2 = 121$

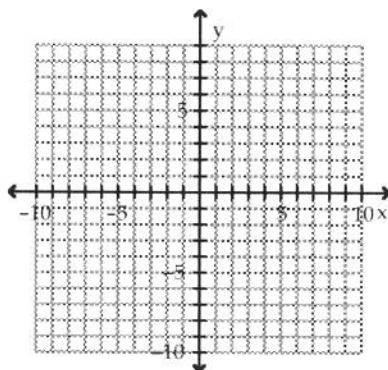
C) $(x + 8)^2 + (y - 3)^2 = 11$

B) $(x - 8)^2 + (y + 3)^2 = 11$

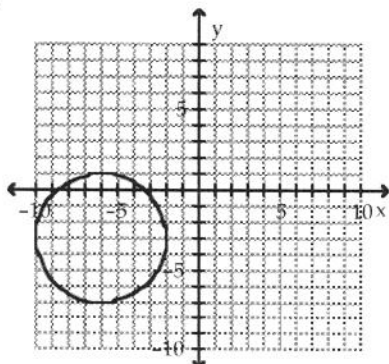
D) $(x + 3)^2 + (y - 8)^2 = 121$

Graph the equation.

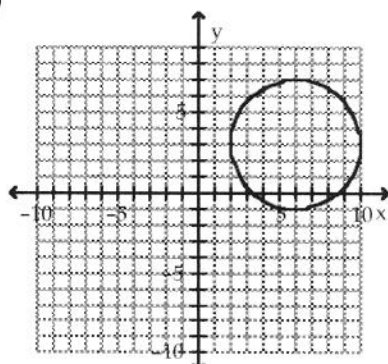
8) $x^2 + y^2 - 12x - 6y + 29 = 0$



A)

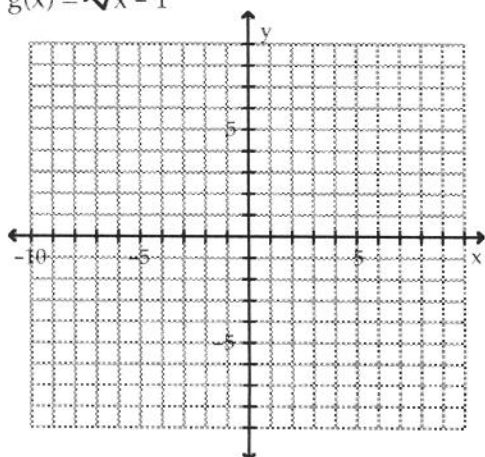


B)

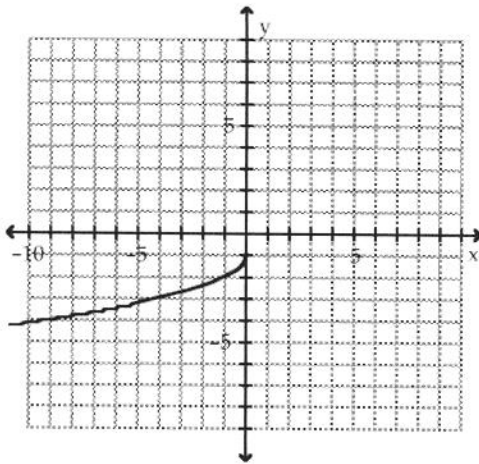


Graph the function.

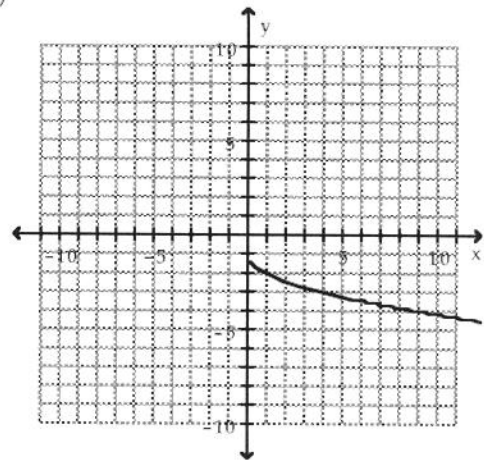
9) $g(x) = \sqrt{x} - 1$



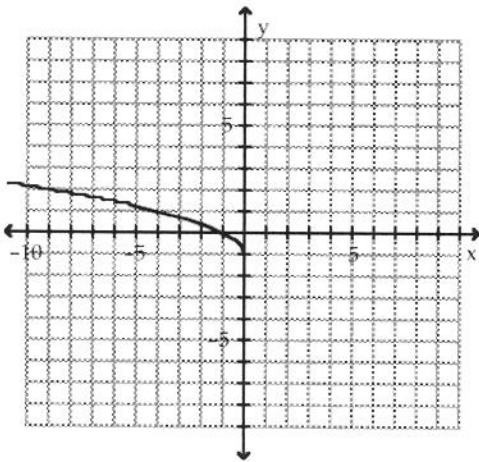
A)



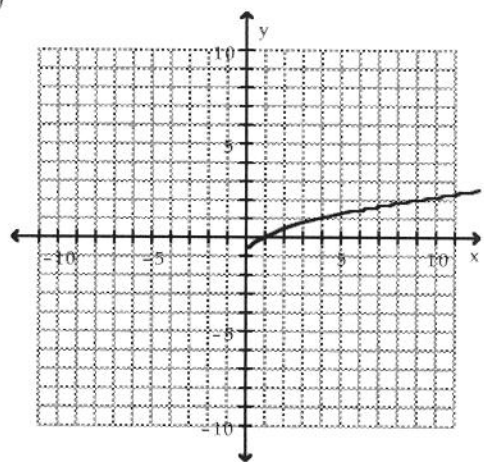
B)



C)



D)



For the given functions f and g , find the indicated composition.

10) $f(x) = 4x^2 + 5x + 4$, $g(x) = 5x - 3$

$(g \circ f)(x)$

A) $20x^2 + 25x + 23$

B) $4x^2 + 25x + 17$

C) $20x^2 + 25x + 17$

D) $4x^2 + 5x + 1$

Determine which two functions are inverses of each other.

11) $f(x) = \frac{x-3}{2}$ $g(x) = 2x - 3$ $h(x) = \frac{x+3}{2}$

A) None

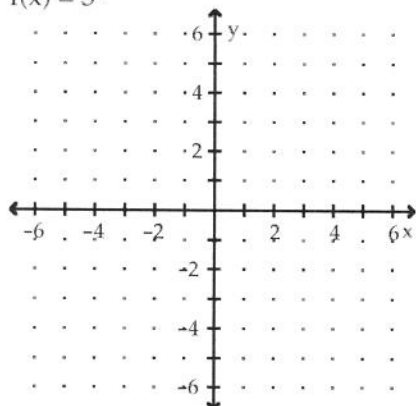
B) $g(x)$ and $h(x)$

C) $f(x)$ and $h(x)$

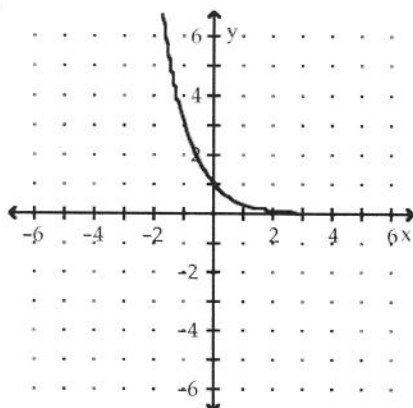
D) $f(x)$ and $g(x)$

Graph the function by making a table of coordinates.

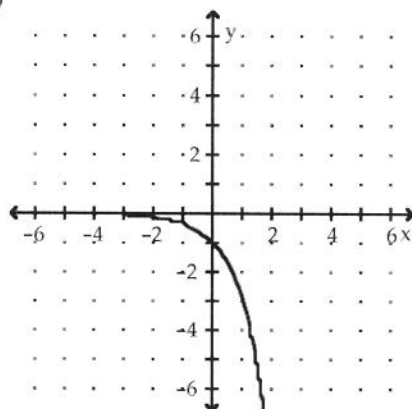
12) $f(x) = 3^x$



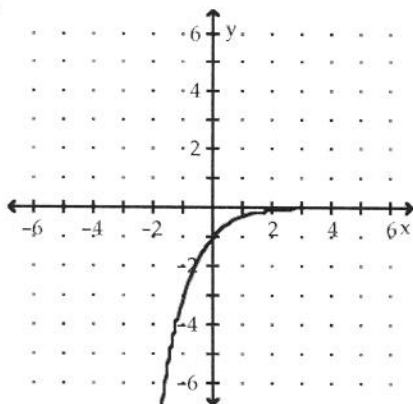
A)



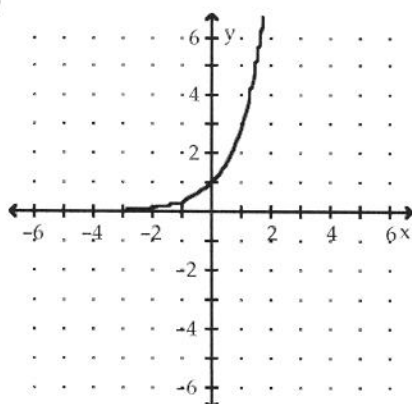
B)



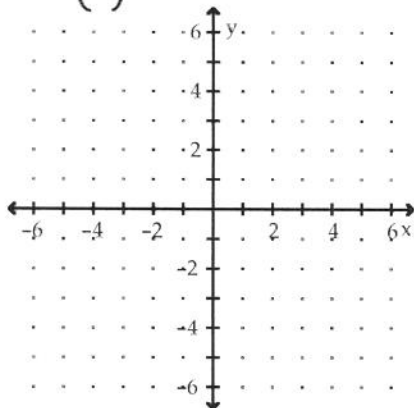
C)



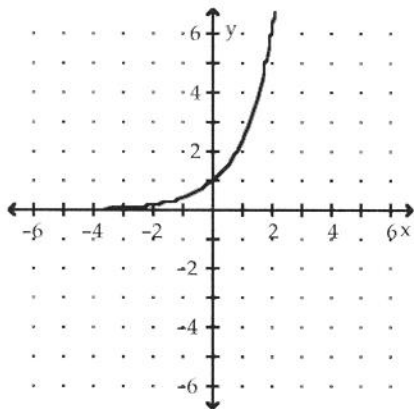
D)



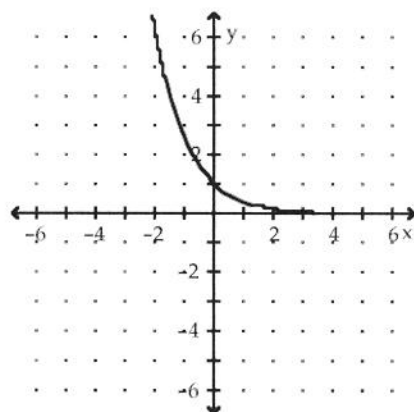
13) $f(x) = \left(\frac{5}{2}\right)^x$



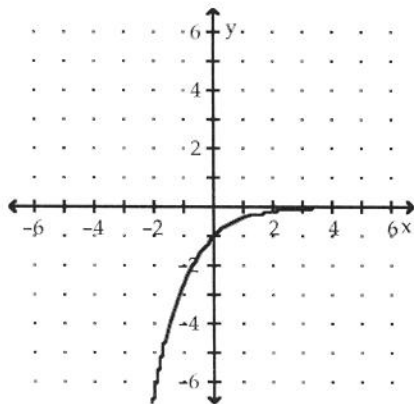
A)



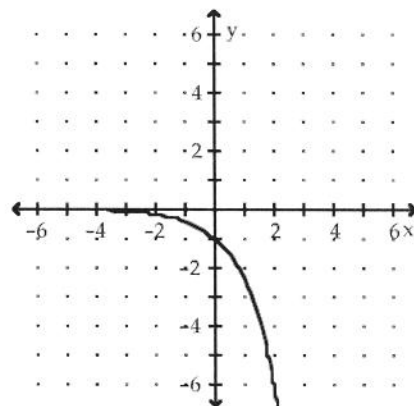
B)



C)



D)



Solve the problem.

- 14) The population in a particular country is growing at the rate of 1.6% per year. If 6,365,000 people lived there in 1999, how many will there be in the year 2003? Use $f(x) = y_0 e^{0.016t}$ and round to the nearest ten-thousand.

A) 6,650,000

B) 6,790,000

C) 7,460,000

D) 8,140,000

Use the compound interest formulas $A = P\left(1 + \frac{r}{n}\right)^{nt}$ and $A = Pe^{rt}$ to solve.

- 15) Find the accumulated value of an investment of \$100 at 10% compounded quarterly for 2 years.
A) \$120.00 B) \$121.84 C) \$121.00 D) \$105.06
- 16) Find the accumulated value of an investment of \$5000 at 8% compounded continuously for 4 years.
A) \$6600.00 B) \$6985.64 C) \$6885.64 D) \$6802.44

Write the equation in its equivalent exponential form.

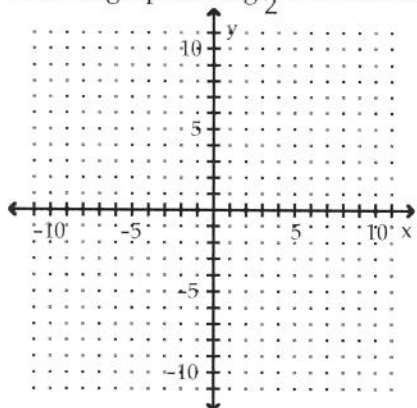
- 17) $\log_5 125 = 3$
A) $125^3 = 5$ B) $3^5 = 125$ C) $5^{125} = 3$ D) $5^3 = 125$

Evaluate the expression without using a calculator.

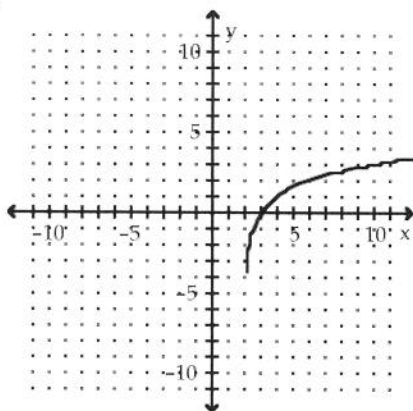
- 18) $\log_2 8$
A) 3 B) $\frac{1}{3}$ C) 1 D) 6
- 19) $\log_{10} 1000$
A) $\frac{1}{1000}$ B) 3 C) 30 D) -3
- 20) $\log_{10} \sqrt{10}$
A) $\frac{1}{10}$ B) $\frac{1}{2}$ C) 10 D) 1
- 21) $\log_3 \frac{1}{9}$
A) 2 B) -2 C) $\frac{1}{2}$ D) 6
- 22) $7^{\log_7 14}$
A) 14 B) 21 C) $\log_7 14$ D) 7

Graph the function.

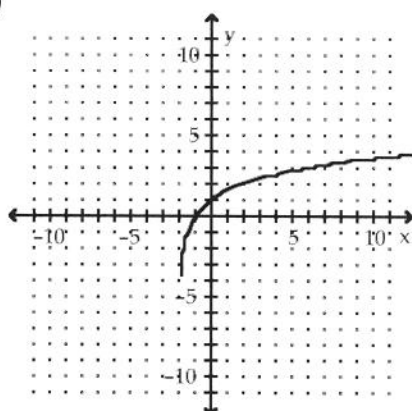
23) Use the graph of $\log_2 x$ to obtain the graph of $f(x) = \log_2 (x + 2)$.



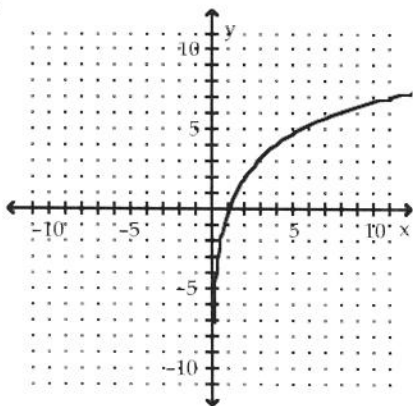
A)



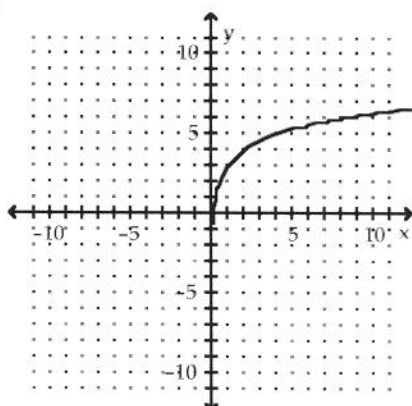
B)



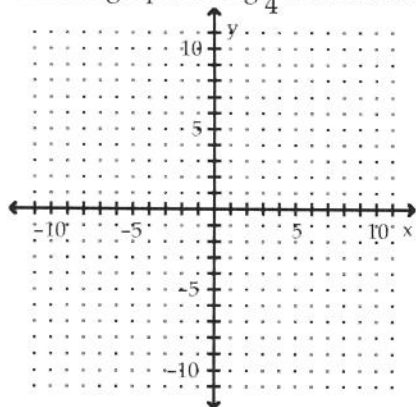
C)



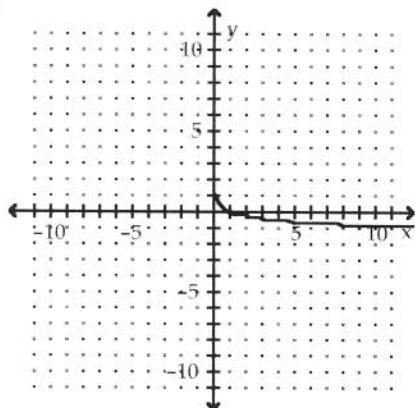
D)



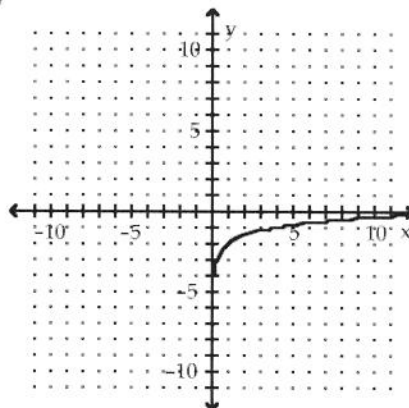
24) Use the graph of $\log_4 x$ to obtain the graph of $f(x) = -2 \log_4 x$.



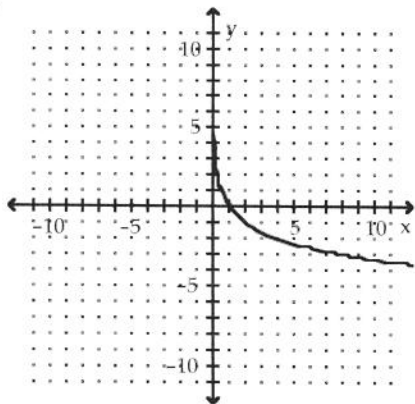
A)



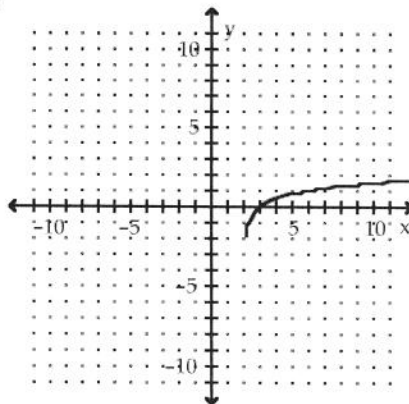
B)



C)



D)



Find the domain of the logarithmic function.

25) $f(x) = \log_8 (x - 8)$

A) $(-\infty, 8)$ or $(8, \infty)$

B) $(8, \infty)$

C) $(-\infty, 0)$ or $(0, \infty)$

D) $(-8, \infty)$

26) $f(x) = \ln (5 - x)$

A) $(-5, \infty)$

B) $(-\infty, 5)$

C) $(-\infty, 5)$ or $(5, \infty)$

D) $(-\infty, 0)$

Evaluate the expression without using a calculator.

27) $\ln e^4$

A) $\frac{1}{4}$

B) e

C) 4

D) 1

Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

28) $\log_8 (8x)$

A) 8

B) $1 + \log_8 x$

C) x

D) 1

29) $\log_3 \left(\frac{9}{x}\right)$

A) $6 - \log_3 x$

B) $-2 \log_3 x$

C) $\frac{2}{x}$

D) $2 - \log_3 x$

30) $\log_2 \sqrt[3]{y}$

A) $\frac{1}{2} \log_3 y$

B) $\frac{1}{3} \log_2 y$

C) $3 \log_2 y$

D) $\frac{1}{3} \log_2 \sqrt[3]{y}$

31) $\log_3 \left(\frac{\sqrt{x}}{9}\right)$

A) $\log_3 x - 2$

B) $-2 \log_3 x$

C) $6 - \frac{1}{2} \log_3 x$

D) $\frac{1}{2} \log_3 x - 2$

Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expressions.

32) $3 \log_b t - \log_b s$

A) $\log_b (t^3 - s)$

B) $\log_b \left(\frac{3t}{s}\right)$

C) $\log_b t^3 \div \log_b s$

D) $\log_b \left(\frac{t^3}{s}\right)$

Use common logarithms or natural logarithms and a calculator to evaluate to four decimal places

33) $\log_6 28$

A) 2.2253

B) 0.5377

C) 1.8597

D) 0.6690

Solve the exponential equation. Use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

34) $e^{4x} = 6$

A) 0.45

B) 7.17

C) 4.08

D) 0.23

Solve the logarithmic equation. Be sure to reject any value of x that produces the logarithm of a negative number or the logarithm of 0.

35) $\log_2 (x + 2) + \log_2 (x - 4) = 4$

A) {7}

B) {6}

C) {6, -4}

D) {-4}

Solve the problem.

36) The formula $A = 100e^{0.041t}$ models the population of a particular city, in thousands, t years after 1998. When will the population of the city reach 145 thousand?

A) 2007

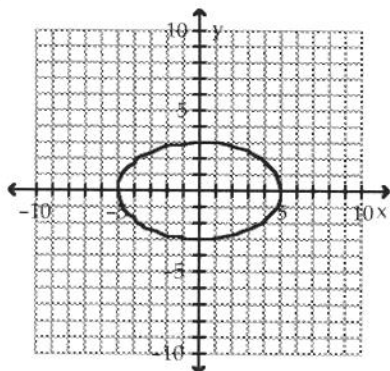
B) 2009

C) 2010

D) 2008

Find the standard form of the equation of the ellipse and give the location of its foci.

37)



A) $\frac{x^2}{25} - \frac{y^2}{9} = 1$

foci at $(-4, 0)$ and $(4, 0)$

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

foci at $(-5, 0)$ and $(5, 0)$

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

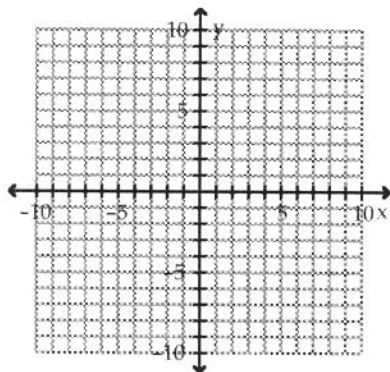
foci at $(-4, 0)$ and $(4, 0)$

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

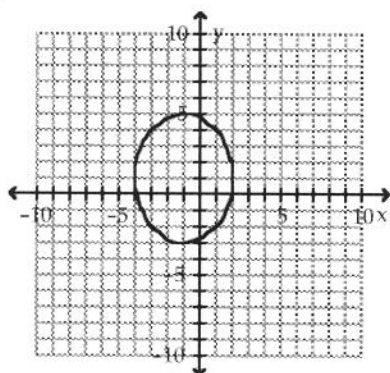
foci at $(-4, 0)$ and $(4, 0)$

Graph the ellipse.

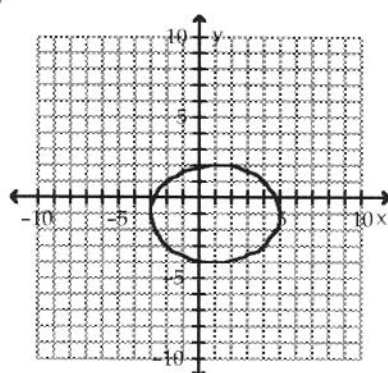
$$38) \frac{(x+1)^2}{9} + \frac{(y-1)^2}{16} = 1$$



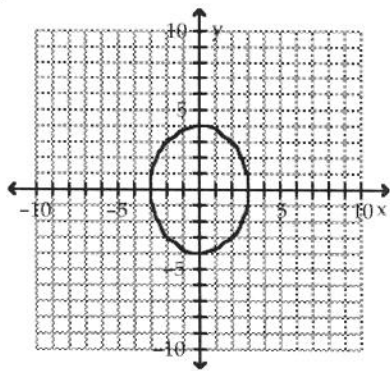
A)



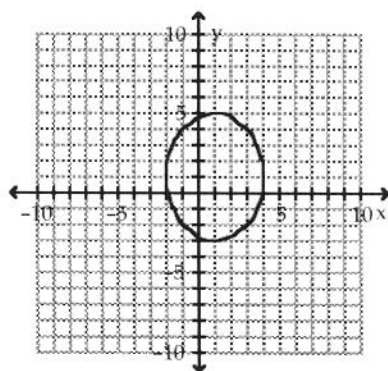
B)



C)



D)



Find the vertices and locate the foci for the hyperbola whose equation is given.

$$39) \frac{y^2}{81} - \frac{x^2}{49} = 1$$

A) vertices: $(-9, 0), (9, 0)$

foci: $(-7, 0), (7, 0)$

C) vertices: $(0, -9), (0, 9)$

foci: $(-\sqrt{130}, 0), (\sqrt{130}, 0)$

B) vertices: $(-7, 0), (7, 0)$

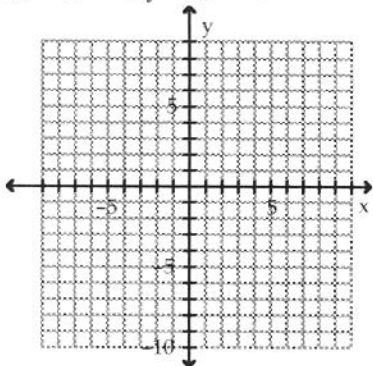
foci: $(-\sqrt{130}, 0), (\sqrt{130}, 0)$

D) vertices: $(0, -9), (0, 9)$

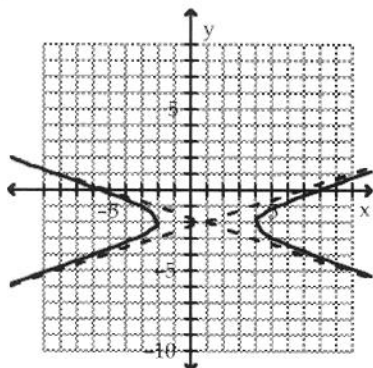
foci: $(0, -\sqrt{130}), (0, \sqrt{130})$

Use the center, vertices, and asymptotes to graph the hyperbola.

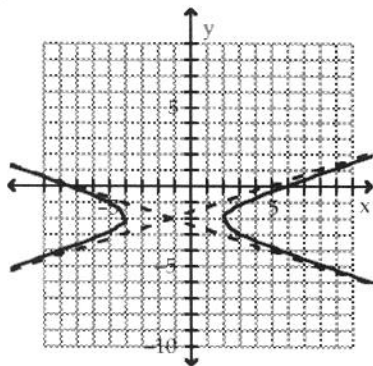
40) $(x + 1)^2 - 9(y + 2)^2 = 9$



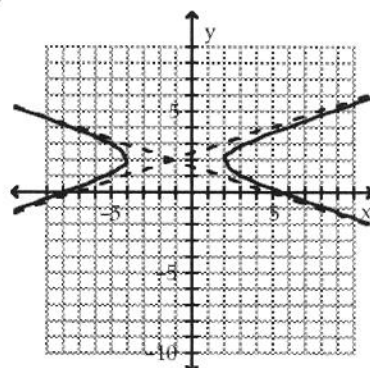
A)



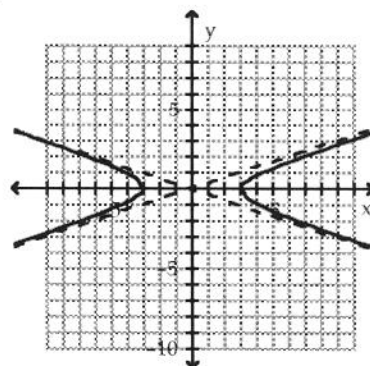
C)



B)



D)



Find the standard form of the equation of the parabola using the information given.

41) Focus: $(-13, 0)$; Directrix: $x = 13$

A) $y^2 = -13x$

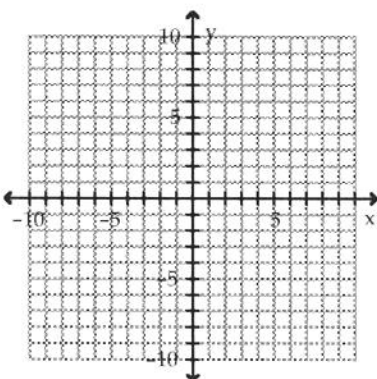
B) $y^2 = -52x$

C) $y^2 = 52x$

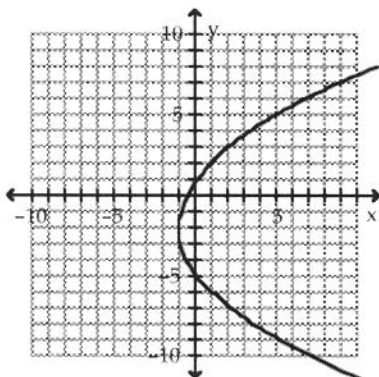
D) $x^2 = -52y$

Graph the parabola with the given equation.

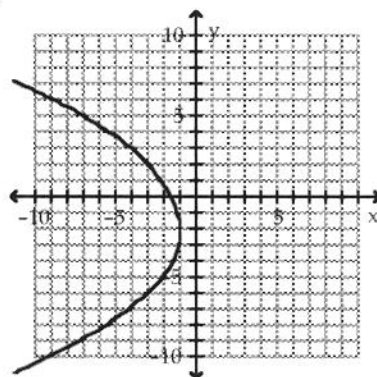
42) $(y + 2)^2 = -8(x + 1)$



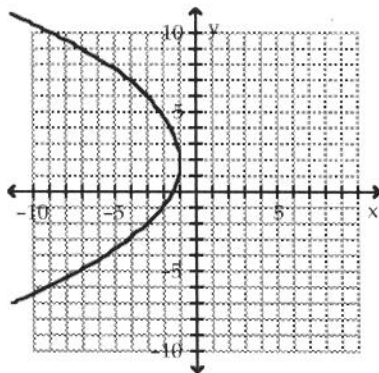
A)



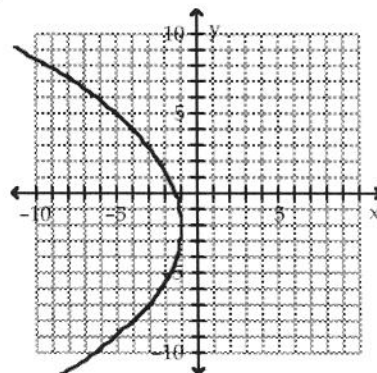
B)



C)



D)



Find the indicated sum.

43) Find the sum of the first 30 terms of the arithmetic sequence: 18, 26, 34, 42, ...

A) 4027

B) 4140

C) 4020

D) 258

Write a formula for the general term (the n th term) of the geometric sequence.

44) $4, 1, \frac{1}{4}, \frac{1}{16}, \frac{1}{64}$

A) $a_n = 4 \cdot \left(\frac{1}{4}\right)^{n-1}$

B) $a_n = 4 \cdot \left(\frac{1}{16}\right)^{n-1}$

C) $a_n = 4 \cdot \left(\frac{1}{4}\right)^{n+1}$

D) $a_n = 4 \cdot \left(\frac{1}{4}\right)^n$

Find the indicated sum. Use the formula for the sum of the first n terms of a geometric sequence.

45) $\sum_{i=1}^5 4(-3)^i$

A) -2460

B) 240

C) -732

D) 69

Find the sum of the infinite geometric series.

46) $4 - 1 + \frac{1}{4} + \dots$

A) -1

B) $\frac{16}{5}$

C) the series has no sum

D) 3

Find the term indicated in the expansion.

47) $(x - 2y)^{14}$; 9th term

A) $768,768x^8y^6$

B) $-384,384x^8y^6$

C) $-384,384x^6y^9$

D) $768,768x^6y^8$

Solve the problem.

48) A restaurant offers a choice of 5 salads, 5 main courses, and 4 desserts. How many possible 3-course meals are there?

A) 14 possible meals

B) 25 possible meals

C) 200 possible meals

D) 100 possible meals

49) A club elects a president, vice-president, and secretary-treasurer. How many sets of officers are possible if there are 15 members and any member can be elected to each position? No person can hold more than one office.

A) 2730

B) 1365

C) 910

D) 32,760

50) In a student government election, 7 seniors, 3 juniors, and 2 sophomores are running for election. Students elect four at-large senators. In how many ways can this be done?

A) 11,880

B) 19,958,400

C) 495

D) 42