Sample Questions

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

Determine whether the equation is linear or nonlinear.

1) $x^2 - 5 = 4$ 1) _____

A) linear B) nonlinear

Objective: (1.1) Recognizing Linear Equations

2) $0.11x + 24 = 0.29$ 2) _____

A) linear B) nonlinear

Objective: (1.1) Recognizing Linear Equations

Solve the equation.

3) $x(5x - 1) = (5x + 1)(x - 3)$ 3) _____

A) $\left\{-\frac{3}{4}\right\}$ B) {2} C) $\left\{-\frac{3}{13}\right\}$ D) $\left\{-\frac{3}{14}\right\}$

Objective: (1.1) Solving Equations That Lead to Linear Equations

4) $\frac{6}{x+4} - \frac{8}{x-4} = \frac{8}{x^2-16}$ 4) _____

A) {32} B) {64} C) {-32} D) $\{2\sqrt{14}\}$

Objective: (1.1) Solving Equations That Lead to Linear Equations

5) $-11x + 1.1 = -36.9 - 1.5x$ 5) _____

A) {3.5} B) {4} C) {-47} D) {3.6}

Objective: (1.1) Solving Linear Equations Involving Decimals

6) $\frac{-3x+5}{2} + 1 = -\frac{6x}{7}$ 6) _____

A) $\left\{\frac{49}{9}\right\}$ B) $\left\{\frac{7}{3}\right\}$ C) $\left\{\frac{49}{33}\right\}$ D) $\left\{-\frac{7}{3}\right\}$

Objective: (1.1) Solving Linear Equations Involving Fractions

7) $-35 - 3x = -10 + 2x$ 7) _____

A) {5} B) {7} C) {-7} D) {-5}

Objective: (1.1) Solving Linear Equations with Integer Coefficients

8) $16x = -15 + 15x$ 8) _____

A) {15} B) {0} C) {-15} D) {-14}

Objective: (1.1) Solving Linear Equations with Integer Coefficients

Write the sentence as an equation. Let the variable x represent the number.

9) The sum of twice a number and 5 is 9. 9) _____

A) $10x = 9$ B) $2x + 5 = 9$ C) $x + 10 = 9$ D) $2x - 5 = 9$

Objective: (1.2) Converting Verbal Statements into Mathematical Statements

Solve the problem.

10) Kevin invested part of his $10,000 bonus in a certificate of deposit that paid 6% annual simple interest, and the remainder in a mutual fund that paid 11% annual simple interest. If his total interest for that year was $900, how much did Kevin invest in the mutual fund? 10) _____

A) $6000 B) $5000 C) $7000 D) $4000

Objective: (1.2) Solving Applications Involving Decimal Equations (Money, Mixture, Interest)

11) A bank loaned out $69,000, part of it at the rate of 15% per year and the rest at a rate of 8% per year. If the interest received was $7480, how much was loaned at 15%? 11) _____

A) $28,000 B) $29,000 C) $40,000 D) $41,000

Objective: (1.2) Solving Applications Involving Decimal Equations (Money, Mixture, Interest)

12) Center City East Parking Garage has a capacity of 253 cars more than Center City West Parking Garage. If the combined capacity for the two garages is 1219 cars, find the capacity for each garage. 12) _____

A) Center City East: 746 cars
Center City West: 473 cars

B) Center City East: 736 cars
Center City West: 483 cars

C) Center City East: 473 cars
Center City West: 746 cars

D) Center City East: 483 cars
Center City West: 736 cars

Objective: (1.2) Solving Applications Involving Unknown Numeric Quantities

13) Two friends decide to meet in Chicago to attend a Cub's baseball game. Rob travels 126 miles in the same time that Carl travels 120 miles. Rob's trip uses more interstate highways and he can average 3 mph more than Carl. What is Rob's average speed? 13) _____

A) 63 mph B) 55 mph C) 60 mph D) 71 mph

Objective: (1.2) Solving Applied Problems Involving Distance, Rate, and Time

14) An experienced bank auditor can check a bank's deposits twice as fast as a new auditor. Working together it takes the auditors 4 hours to do the job. How long would it take the experienced auditor working alone? 14) _____

A) 8 hr B) 4 hr C) 12 hr D) 6 hr

Objective: (1.2) Solving Applied Working Together Problems

Decide what number must be added to the binomial to make a perfect square trinomial.

15) $x^2 + 14x$ 15) _____

A) 98 B) 25 C) 49 D) 7

Objective: (1.4) Solving Quadratic Equations by Completing the Square

Solve the equation by completing the square.

16) $7x^2 - 2x - 4 = 0$ 16) _____

A) $\left\{\frac{1-\sqrt{29}}{7}, \frac{1+\sqrt{29}}{7}\right\}$

B) $\left\{-4, \frac{30}{7}\right\}$

C) $\left\{\frac{7-\sqrt{29}}{49}, \frac{7+\sqrt{29}}{49}\right\}$

D) $\left\{\frac{-1-\sqrt{29}}{7}, \frac{-1+\sqrt{29}}{7}\right\}$

Objective: (1.4) Solving Quadratic Equations by Completing the Square

Solve the equation by factoring.

17) $3x^2 - 8x = 0$ 17) _____

A) $\left\{\frac{8}{3}, -\frac{8}{3}\right\}$ B) $\left\{-\frac{8}{3}, 0\right\}$ C) $\left\{\frac{8}{3}, 0\right\}$ D) {0}

Objective: (1.4) Solving Quadratic Equations by Factoring and the Zero Product Property

Find the real solutions, if any, of the equation. Use the quadratic formula.

18) $x^2 + x + 2 = 0$ 18) _____

A) $\left\{\frac{1-\sqrt{7}}{2}, \frac{1+\sqrt{7}}{2}\right\}$ B) $\left\{\frac{-1-\sqrt{7}}{2}, \frac{1+\sqrt{7}}{2}\right\}$

C) $\left\{\frac{-1-\sqrt{7}}{2}, \frac{-1+\sqrt{7}}{2}\right\}$ D) no real solution

Objective: (1.4) Solving Quadratic Equations Using the Quadratic Formula

19) $x^2 + 7x + 5 = 0$ 19) _____

A) $\left\{\frac{-7-\sqrt{29}}{2}, \frac{-7+\sqrt{29}}{2}\right\}$ B) $\left\{\frac{-7-\sqrt{29}}{14}, \frac{-7+\sqrt{29}}{14}\right\}$

C) $\left\{\frac{-7-\sqrt{69}}{2}, \frac{-7+\sqrt{69}}{2}\right\}$ D) $\left\{\frac{7-\sqrt{29}}{2}, \frac{7+\sqrt{29}}{2}\right\}$

Objective: (1.4) Solving Quadratic Equations Using the Quadratic Formula

Solve the equation using the square root property.

20) $(2x + 5)^2 = 49$ 20) _____

A) {1, 6} B) {0, 1} C) {-27, 27} D) {-6, 1}

Objective: (1.4) Solving Quadratic Equations Using the Square Root Property

Use the discriminant to determine the number and nature of the solutions to the quadratic equation. Do not solve the equation.

21) $x^2 - 4x + 5 = 0$ 21) _____

A) two nonreal solutions B) two real solutions C) exactly one real solution

Objective: (1.4) Using the Discriminant to Determine the Type of Solutions of a Quadratic Equation

Solve the problem.

22) Janet is training for a triathlon. Yesterday she jogged for 12 miles and then cycled another 31.5 miles. Her speed while cycling was 6 miles per hour faster than while jogging. If the total time for jogging and cycling was 3.75 hours, at what rate did she cycle? 22) _____

A) 14 miles per hour B) 15 miles per hour

C) 16 miles per hour D) 13 miles per hour

Objective: (1.5) Solving Applications Involving Distance, Rate, and Time

23) The square of the difference between a number and 9 is 9. Find the number(s). 23) _____

A) 12 B) 6, 12 C) 90 D) 78, 84

Objective: (1.5) Solving Applications Involving Unknown Numeric Quantities

24) The length of a vegetable garden is 3 feet longer than its width. If the area of the garden is 54 square feet, find its dimensions. 24) _____

A) 5 ft by 10 ft B) 5 ft by 8 ft C) 7 ft by 10 ft D) 6 ft by 9 ft

Objective: (1.5) Solving Geometric Applications

25) George and Matt have a painting business. George has less experience and it takes him 3 hours more to paint a medium sized room than it takes Matt. Working together they can paint a medium sized room in 6 hours. How long does it take each of them working individually? Round to the nearest tenth of an hour. 25) _____

A) George: 12.9 hours, Matt: 9.9 hours B) George: 12.0 hours, Matt: 9.0 hours

C) George: 13.7 hours, Matt: 10.7 hours D) George: 14.5 hours, Matt: 11.5 hours

Objective: (1.5) Solving Working Together Applications

26) A ball is thrown vertically upward from the top of a building 144 feet tall with an initial velocity of 128 feet per second. The distance s (in feet) of the ball from the ground after t seconds is $s = 144 + 128t - 16t^2$. After how many seconds will the ball pass the top of the building on its way down? 26) _____

A) 7 sec B) 144 sec C) 10 sec D) 8 sec

Objective: (1.5) Using the Projectile Motion Model

Solve the equation after making an appropriate substitution.

27) $x^{1/2} - 9x^{1/4} + 18 = 0$ 27) _____

A) {9, 36} B) {3, 6} C) {81, 1296} D) {-3, -6}

Objective: (1.6) Solving Equations That Are Quadratic in Form (Disguised Quadratics)

28) $x^{2/3} - 7x^{1/3} + 10 = 0$ 28) _____

A) {-125, -8} B) {8, 125} C) {-5, -2} D) {2, 5}

Objective: (1.6) Solving Equations That Are Quadratic in Form (Disguised Quadratics)

Find all solutions.

29) $x^3 + 2x^2 - x - 2 = 0$ 29) _____

A) {1, –2, 2} B) {–2, 2} C) {4} D) {–1, 1, –2}

Objective: (1.6) Solving Higher–Order Polynomial Equations

Solve the inequality. Express your answer using interval notation.

30) $|2k - 8| \geq 9$ 30) _____

A) $\left(-\frac{1}{2}, \frac{17}{2}\right)$ B) $\left[\frac{17}{2}, \infty\right)$

C) $\left(-\infty, -\frac{1}{2}\right] \cup \left[\frac{17}{2}, \infty\right)$ D) $\left[-\frac{1}{2}, \frac{17}{2}\right]$

Objective: (1.8) Solving an Absolute Value "Greater Than" Inequality

31) $|x - 6| < 14$ 31) _____

A) $(-\infty, -8)$ B) $(-\infty, 20)$ C) $(-8, 20)$ D) $(-20, 8)$

Objective: (1.8) Solving an Absolute Value "Less Than" Inequality

Solve the equation.

32) $|x^2 + 13x - 7| = 7$ 32) _____

A) {-14, -13, 0, 1} B) {-14, -13, 1} C) {-13, –1, 0, 14} D) {-14, 14, –1, 1}

Objective: (1.8) Solving an Absolute Value Equation

Solve the polynomial inequality. Express the solution in interval notation.

33) $(x + 5)(x - 5) \le 0$ 33) _____

A) $(-\infty, -5] \cup [5, \infty)$ B) $(-\infty, -5) \cup (5, \infty)$ C) [-5, 5] D) (-5, 5)

Objective: (1.9) Solving Polynomial Inequalities

34) $(x - 1)(x + 8) > 0$ 34) _____

A) (-8, 1) B) $(-\infty, -1) \cup (8, \infty)$ C) $(-\infty, -8) \cup (1, \infty)$ D) $(-8, \infty)$

Objective: (1.9) Solving Polynomial Inequalities

Solve the rational inequality. Express the solution in interval notation.

35) $\frac{x - 8}{x + 1} < 1$ 35) _____

A) $(-\infty, -1)$ B) (-1, 8) C) $(-\infty, -1) \cup (8, \infty)$ D) $(-1, \infty)$

Objective: (1.9) Solving Rational Inequalities

36) $\frac{3x}{x + 5} < x$ 36) _____

A) $(-\infty, -5) \cup (0, \infty)$ B) $(-\infty, -5) \cup (-2, 0)$

C) $(-\infty, 2) \cup (5, \infty)$ D) $(-5, -2) \cup (0, \infty)$

Objective: (1.9) Solving Rational Inequalities

Determine whether the points A, B, and C form a right triangle.

37) A = (-6, 7); B = (–4, 11); C = (–2, 10) 37) _____

A) Yes B) No

Objective: (2.1) Finding the Distance between Two Points Using the Distance Formula

Find the distance d(A, B) between the points A and B.

38) A = (1, 5); B = (-3, -2) 38) _____

A) 28 B) $\sqrt{65}$ C) $\sqrt{33}$ D) 3

Objective: (2.1) Finding the Distance between Two Points Using the Distance Formula

Find the midpoint of the line segment joining the points A and B.

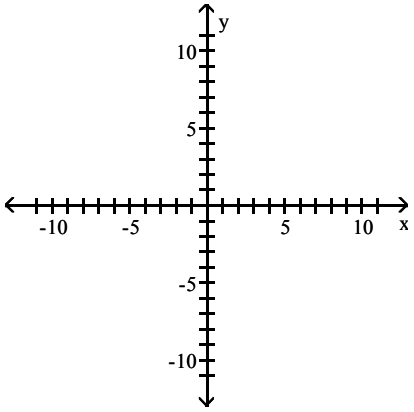
39) A = (3, 5); B = (9, 3) 39) _____

A) (-6, 2) B) $(6, 4)$ C) (12, 8) D) $(4, 6)$

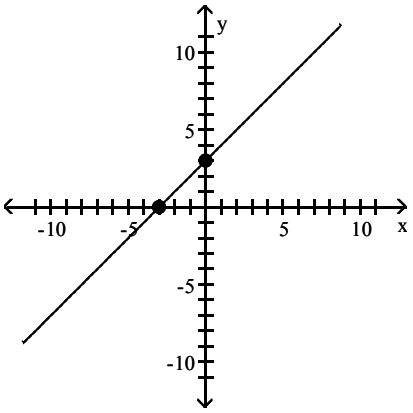
Objective: (2.1) Finding the Midpoint of a Line Segment Using the Midpoint Formula

Sketch the graph for the equation by plotting points.

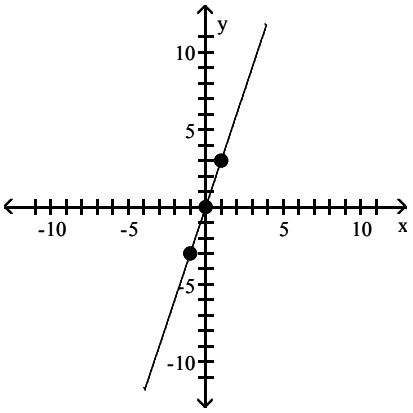
40) $y = x + 3$ 40) _____



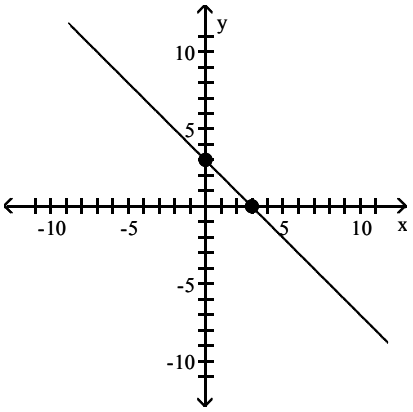
A)



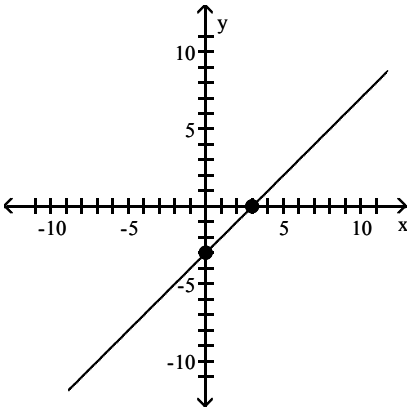
B)



C)



D)



Objective: (2.1) Graphing Equations by Plotting Points

Determine whether the indicated ordered pair lies on the graph of the given equation.

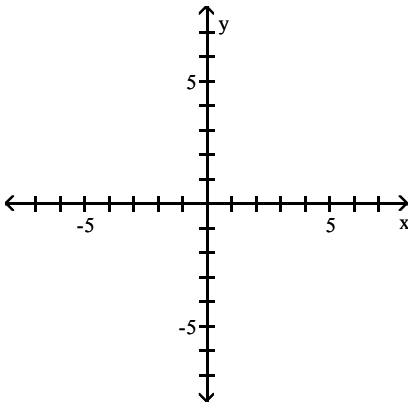
41) $y = |x|$, $(3, -3)$ 41) _____

A) Yes B) No

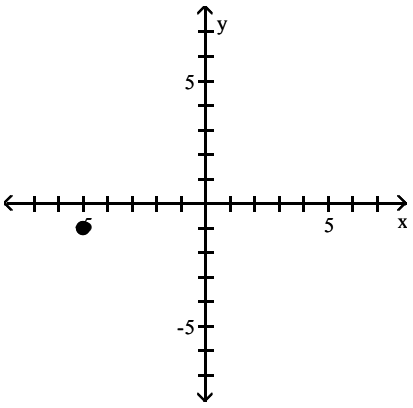
Objective: (2.1) Graphing Equations by Plotting Points

Plot the ordered pair in the Cartesian plane, and state in which quadrant or on which axis it lies.

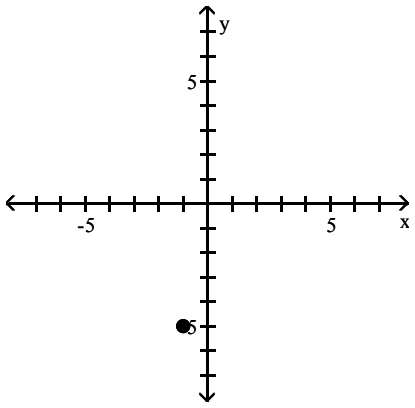
42) (-1, -5) 42) _____



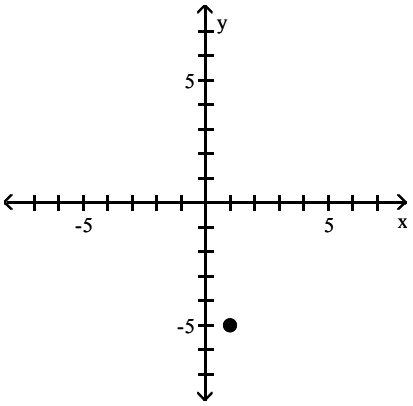
A) Quadrant III



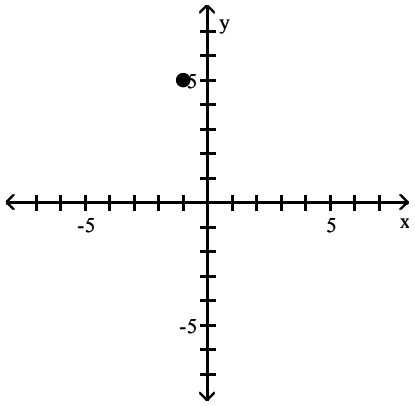
B) Quadrant III



C) Quadrant IV



D) Quadrant II



Objective: (2.1) Plotting Ordered Pairs

Classify the function as a polynomial function, rational function, or root function, and then find the domain. Write the domain in interval notation.

43) $h(t) = \dfrac{t - 4}{t^3 - 9t}$ 43) _____

A) rational function; $(-\infty, 0) \cup (0, \infty)$
B) rational function; $(-\infty, \infty)$
C) rational function; $(-\infty, -3) \cup (-3, 0) \cup (0, 3) \cup (3, \infty)$
D) rational function; $(-\infty, 4) \cup (4, \infty)$

Objective: (3.1) Determining the Domain of a Function Given the Equation

44) $h(x) = \frac{x^2}{x^2 + 8}$ 44) _____

A) rational function; $(-\infty, 0) \cup (0, \infty)$ B) rational function; $(-\infty, \infty)$
C) rational function; $(-8, \infty)$ D) rational function; $(-\infty, -8) \cup (-8, \infty)$

Objective: (3.1) Determining the Domain of a Function Given the Equation

Determine whether the equation defines y as a function of x.

45) $x = y^2$ 45) _____

A) function B) not a function

Objective: (3.1) Determining Whether Equations Represent Functions

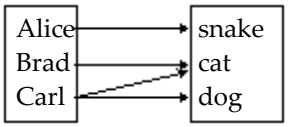
46) $y = x^2$ 46) _____

A) function B) not a function

Objective: (3.1) Determining Whether Equations Represent Functions

Determine whether the relation represents a function. If it is a function, state the domain and range.

47) 47) _____



A) function
domain: {snake, cat, dog}
range: {Alice, Brad, Carl}
B) function
domain: {Alice, Brad, Carl}
range: {snake, cat, dog}
C) not a function

Objective: (3.1) Understanding the Definitions of Relations and Functions

Evaluate the function at the indicated value.

48) Find f(1) when $f(x) = \frac{x^2 - 4}{x - 3}$. 48) _____

A) $\frac{3}{2}$ B) $-\frac{3}{4}$ C) $-\frac{1}{2}$ D) $-\frac{5}{2}$

Objective: (3.1) Using Function Notation; Evaluating Functions

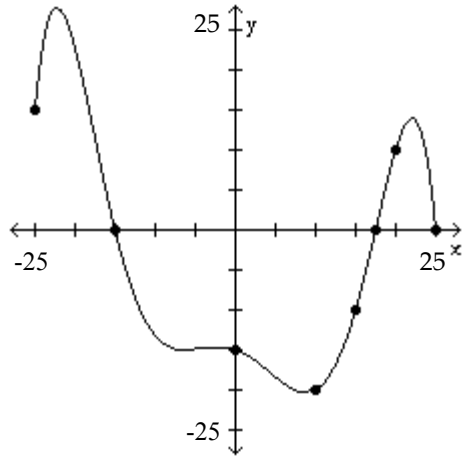
49) Find f(1) when $f(x) = x^2 + 3x + 2$. 49) _____

A) -4 B) 0 C) 6 D) 2

Objective: (3.1) Using Function Notation; Evaluating Functions

The graph of a function f is given. Use the graph to answer the question.

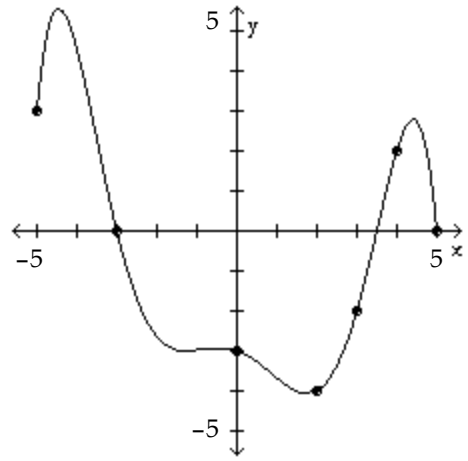
50) What is the y–intercept? 50) _____



A) (0, 25) B) (0, 17.5) C) (0, -15) D) (0, -20)

Objective: (3.2) Determining Information about a Function from a Graph

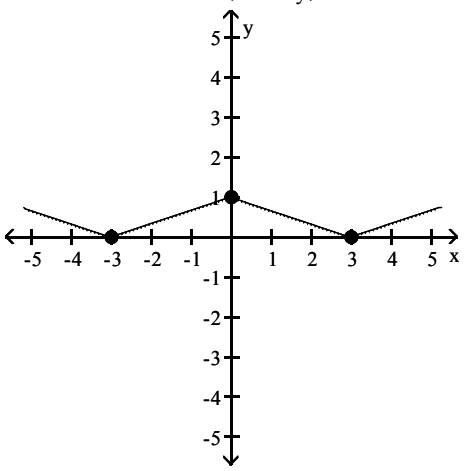
51) Is f(3) positive or negative? 51) _____



A) positive B) negative

Objective: (3.2) Determining Information about a Function from a Graph

52) Find the values of x, if any, at which f has a relative maximum. What are the relative maxima? 52) _____

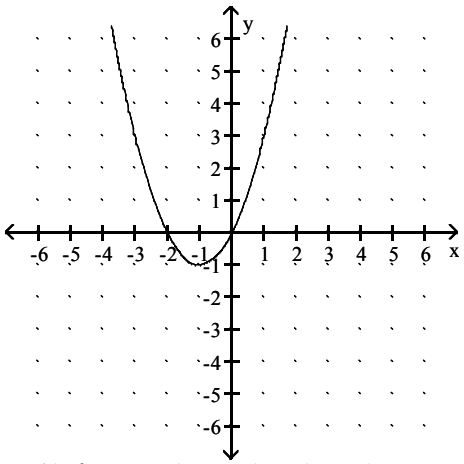


A) f has a relative maximum at x = 0; the relative maximum is 1
B) f has no relative maximum
C) f has a relative maximum at x = 3; the relative maximum is 1
D) f has a relative maximum at x = –3 and 3; the relative maximum is 0

Objective: (3.2) Determining Relative Maximum and Relative Minimum Values of a Function

Use the graph to determine the function's domain and range. Write the domain and range in interval notation.

53) 53) _____



A) domain: (–∞, –1) or (–1, ∞)
range: (–∞, -1) or (-1, ∞)

B) domain: (–∞, ∞)
range: (–∞, ∞)

C) domain: [–1, ∞)
range: [-1, ∞)

D) domain: (–∞, ∞)
range: [-1, ∞)

Objective: (3.2) Determining the Domain and Range of a Function from Its Graph

Find the x–intercept(s) and the y–intercept of the function.

54) $h(x) = x^2 - 3x + 2$ 54) _____

A) (1, 0), (-2, 0), (0, 2)
B) (1, 0), (2, 0), (0, 2)
C) (-1, 0), (-2, 0), (0, 2)
D) (-1, 0), (2, 0), (0, 2)

Objective: (3.2) Determining the Intercepts of a Function

Determine algebraically whether the function is even, odd, or neither.

55) $f(x) = \sqrt[3]{x}$ 55) _____

A) even B) odd C) neither

Objective: (3.2) Determining Whether a Function Is Even, Odd, or Neither

56) $f(x) = \sqrt{x}$ 56) _____

A) even B) odd C) neither

Objective: (3.2) Determining Whether a Function Is Even, Odd, or Neither

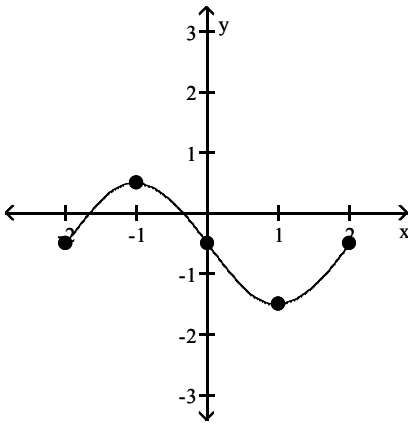
57) $f(x) = 9x^3 + 8$ 57) _____

A) even B) odd C) neither

Objective: (3.2) Determining Whether a Function Is Even, Odd, or Neither

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

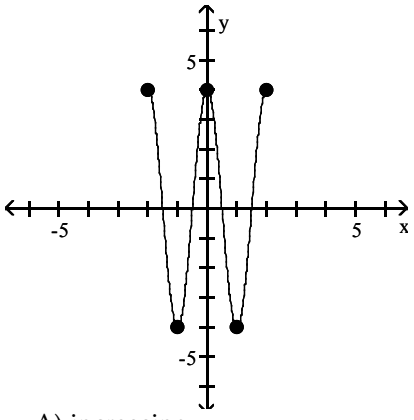
58) (-1, 0) 58) _____



A) increasing B) constant C) decreasing

Objective: (3.2) Determining Whether a Function Is Increasing, Decreasing, or Constant

59) (- 1, 0) 59) _____

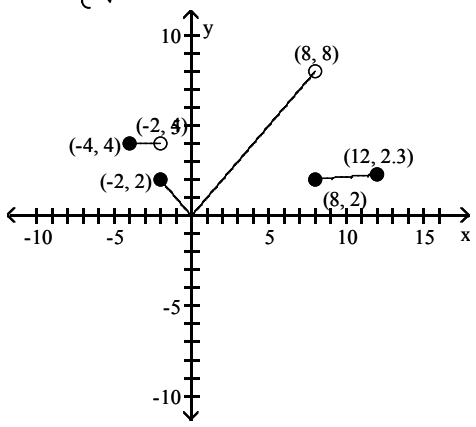


A) increasing B) constant C) decreasing

Objective: (3.2) Determining Whether a Function Is Increasing, Decreasing, or Constant

Based on the graph, determine the range of f.

60) $f(x) = \begin{cases} 4 & \text{if } -4 \le x < -2 \\ |x| & \text{if } -2 \le x < 8 \\ \sqrt[3]{x} & \text{if } 8 \le x \le 12 \end{cases}$ 60) _____

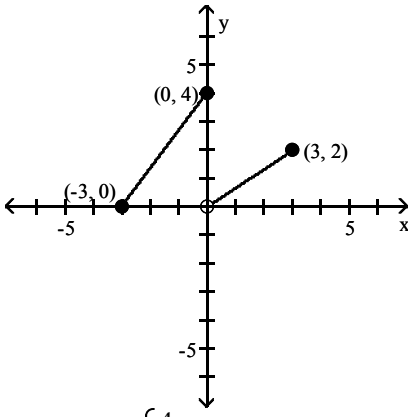


A) $[0, \infty)$ B) $[0, \sqrt[3]{12}]$ C) $[0, 8)$ D) $[0, 8]$

Objective: (3.3) Analyzing Piecewise–Defined Functions

Find the rule that defines each piecewise–defined function.

61) 61) _____



A) $f(x) = \begin{cases} \frac{4}{3}x - 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 \le x \le 3 \end{cases}$

B) $f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x + 2 & \text{if } 0 < x \le 3 \end{cases}$

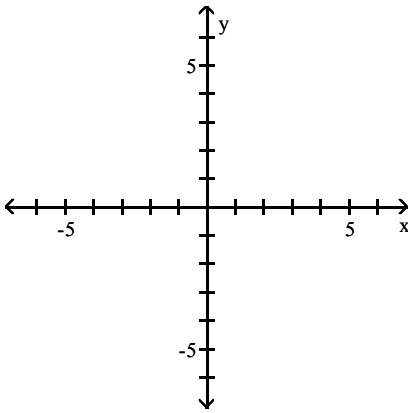
C) $f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 < x \le 3 \end{cases}$

D) $f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } 0 < x \le 3 \end{cases}$

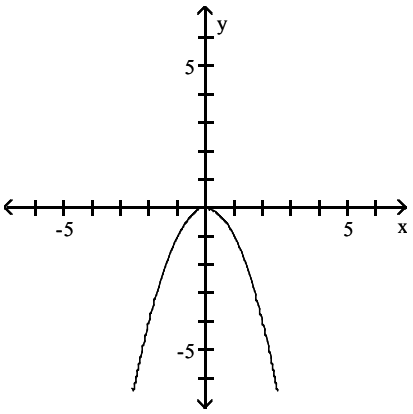
Objective: (3.3) Analyzing Piecewise–Defined Functions

Graph the function.

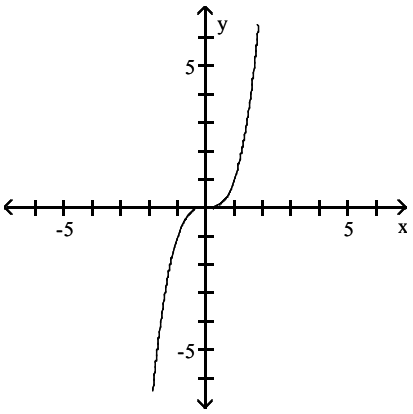
62) $f(x) = x^2$ 62) _____



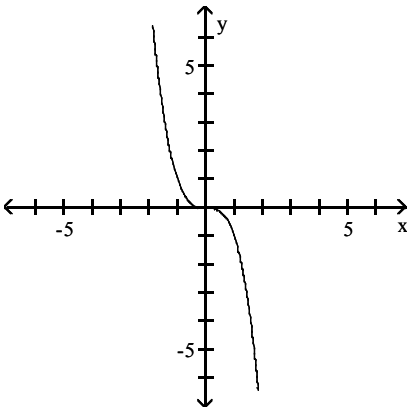
A)



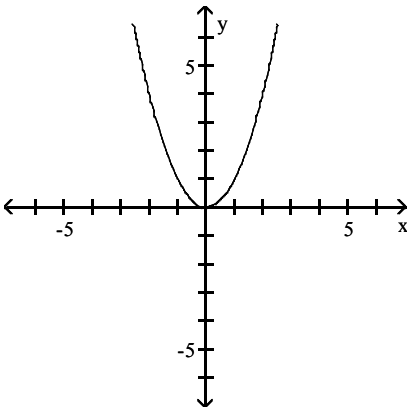
B)



C)



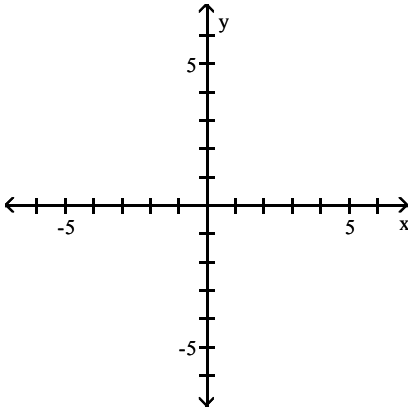
D)



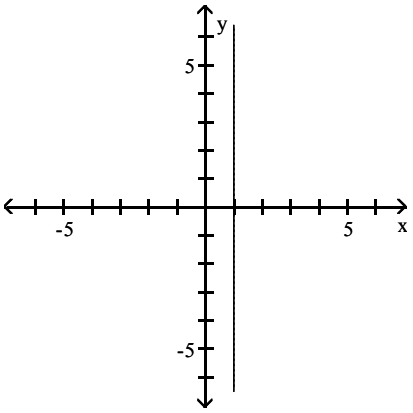
Objective: (3.3) Sketching the Graphs of the Basic Functions

63) f(x) = x

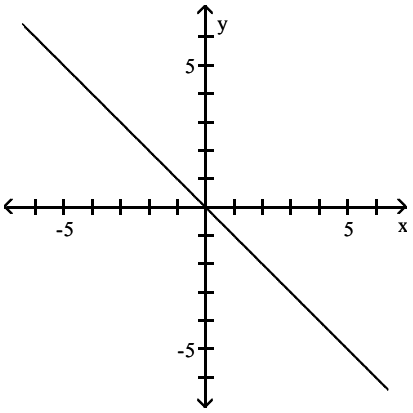
63) _____



A)



B)



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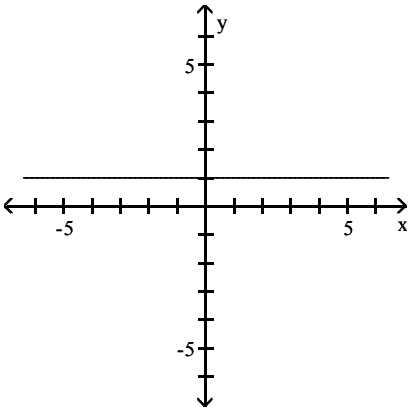
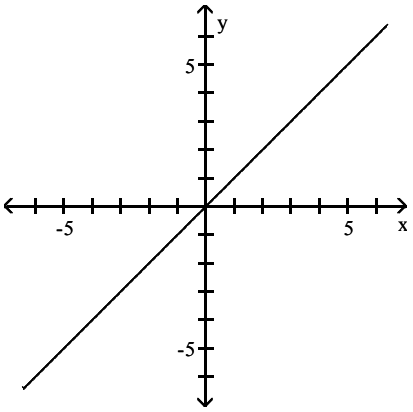


D)



Objective: (3.3) Sketching the Graphs of the Basic Functions

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

64) A cellular phone plan had the following schedule of charges: 64) _____

Basic service, including 100 minutes of calls	$20.00 per month
2nd 100 minutes of calls	$0.075 per minute
Additional minutes of calls	$0.10 per minute

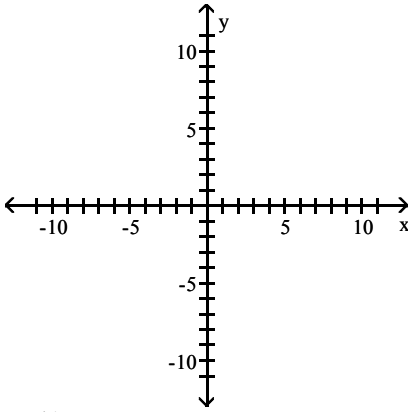
What is the charge for 200 minutes of calls in one month?
What is the charge for 250 minutes of calls in one month?
Construct a function that relates the monthly charge C for x minutes of calls.

Objective: (3.3) Solving Applications of Piecewise–Defined Functions

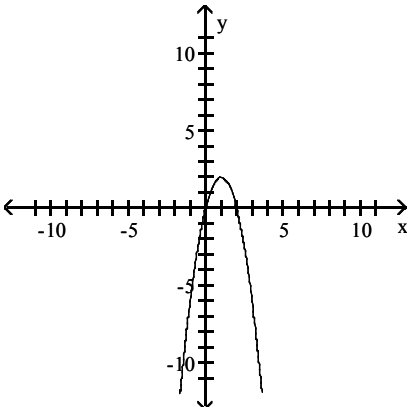
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

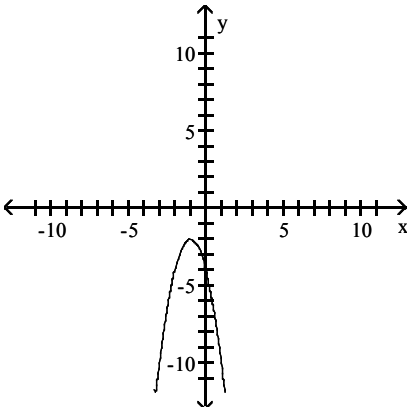
65) $f(x) = -2(x + 1)^2 + 2$ 65) _____



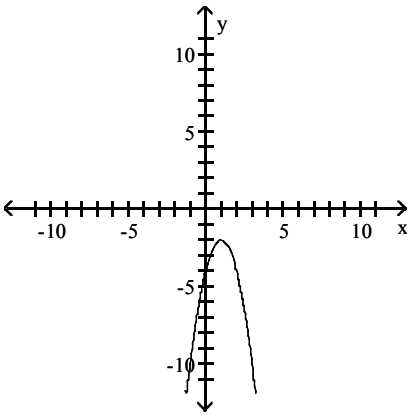
A)



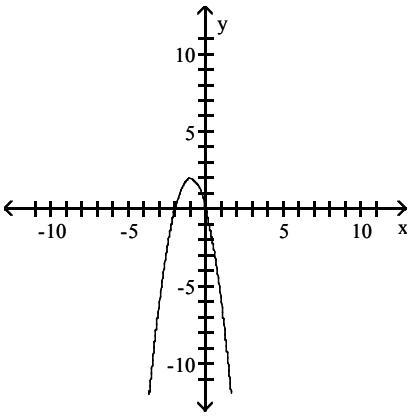
B)



C)

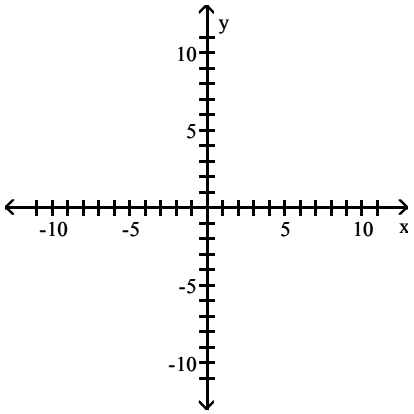


D)

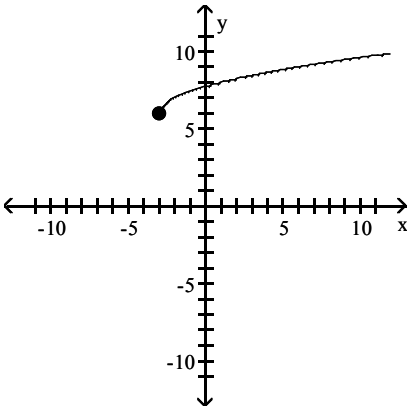


Objective: (3.4) Using Combinations of Transformations to Graph Functions

66) $f(x) = \sqrt{x - 3} - 6$ 66) _____



A)



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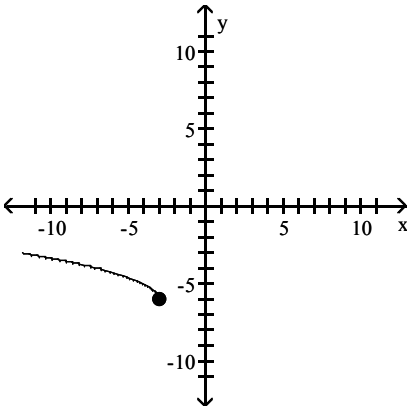

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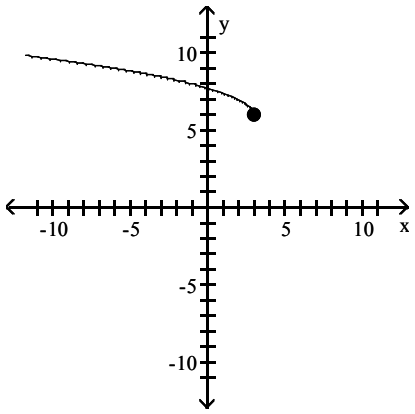

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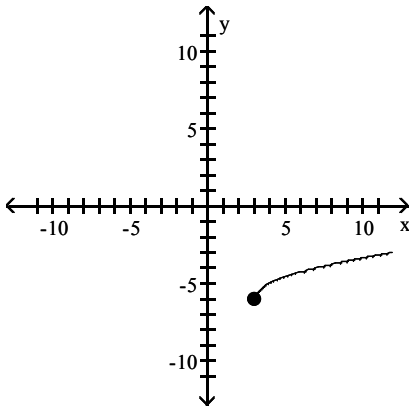
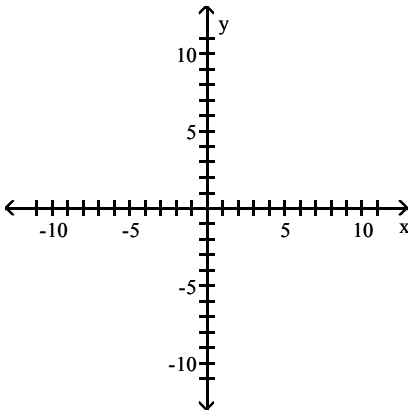
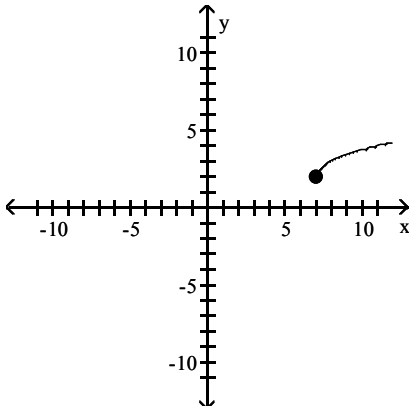


Objective: (3.4) Using Horizontal Shifts to Graph Functions

67) $f(x) = \sqrt{x - 7} + 2$ 67) _____



A)



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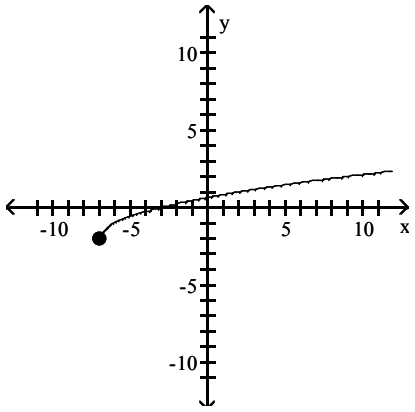

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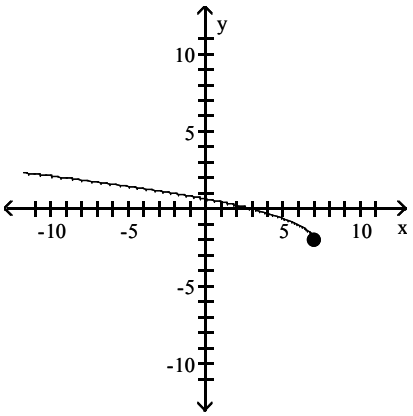

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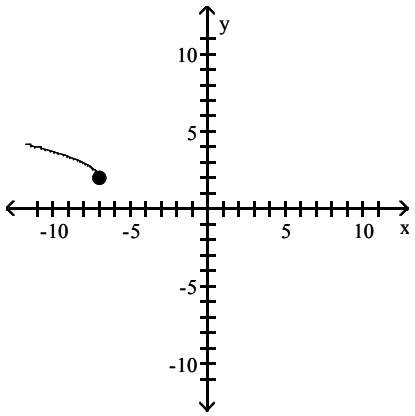
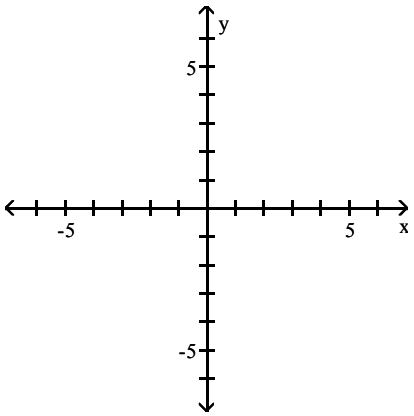
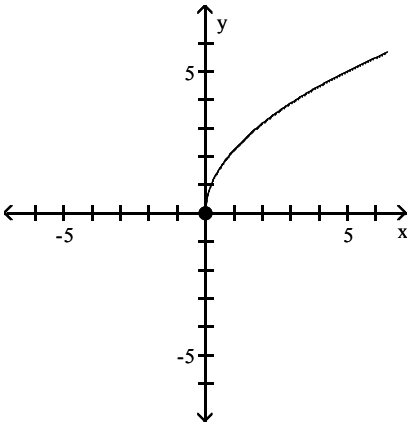


Objective: (3.4) Using Horizontal Shifts to Graph Functions

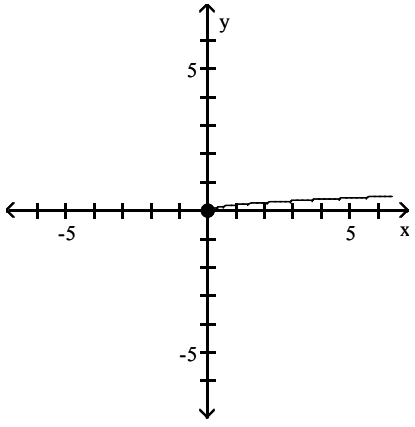
68) $f(x) = \sqrt{5x}$ 68) _____



A)



B)



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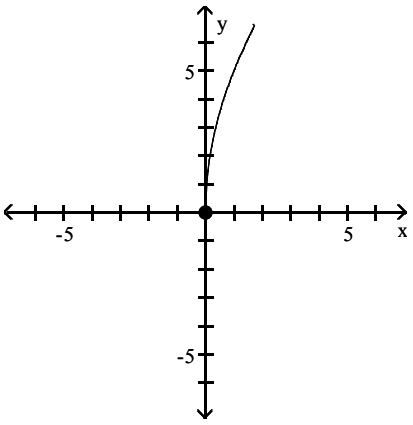

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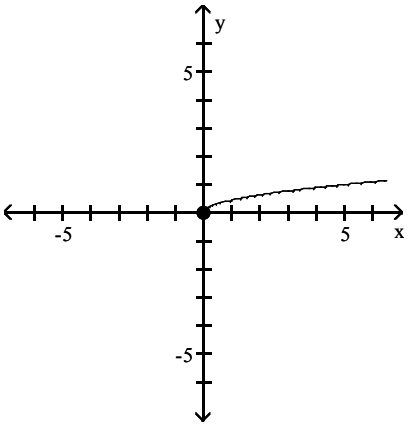
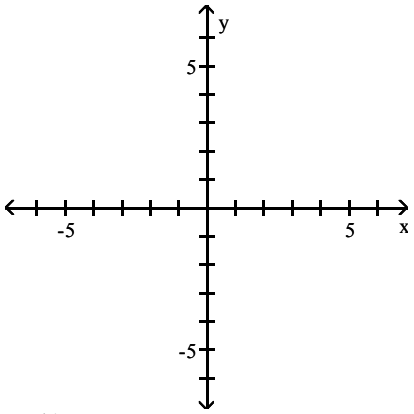
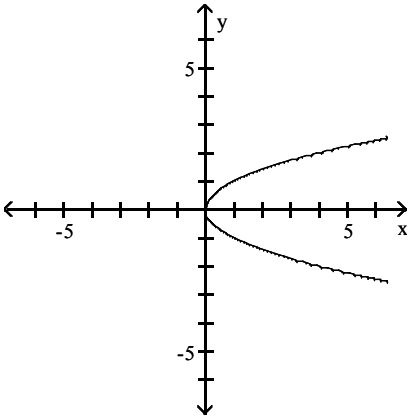


Objective: (3.4) Using Horizontal Stretches and Compressions to Graph Functions

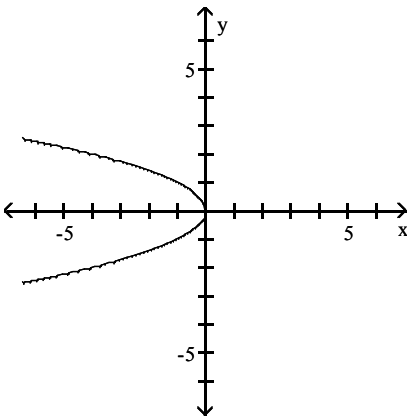
69) $f(x) = -x^2$ 69) _____



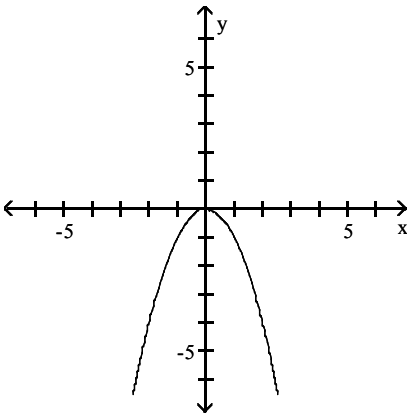
A)



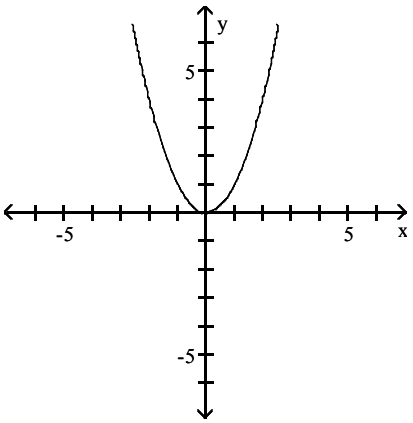
B)



C)

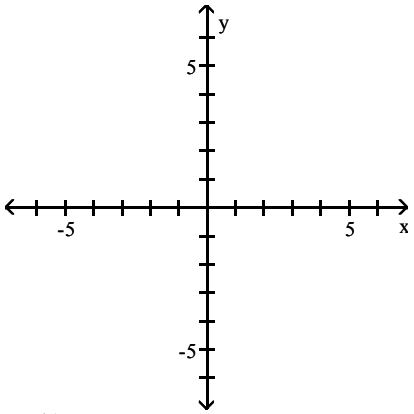


D)

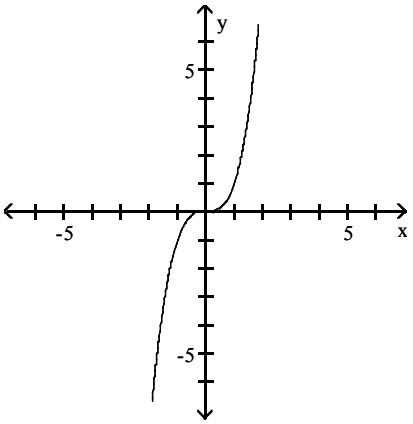


Objective: (3.4) Using Reflections to Graph Functions

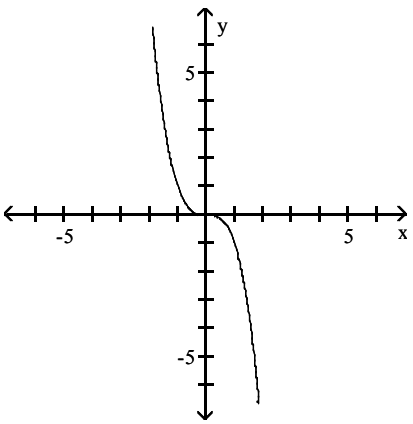
70) $f(x) = -x^3$ 70) _____



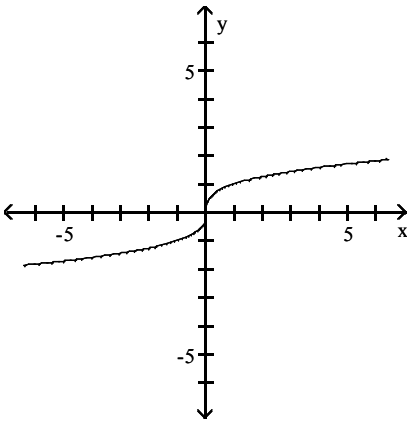
A)



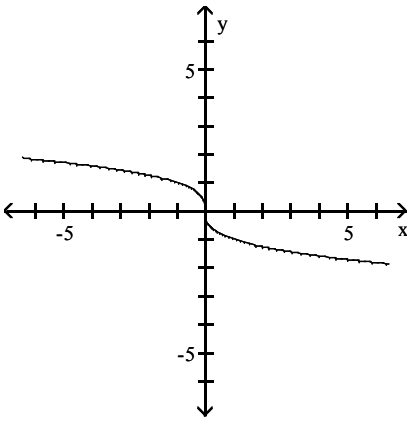
B)



C)

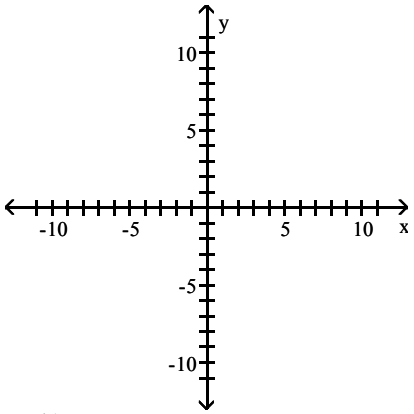


D)

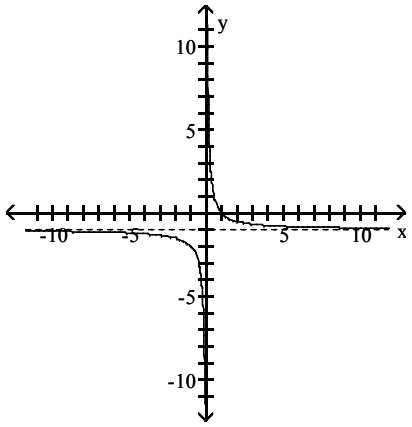


Objective: (3.4) Using Reflections to Graph Functions

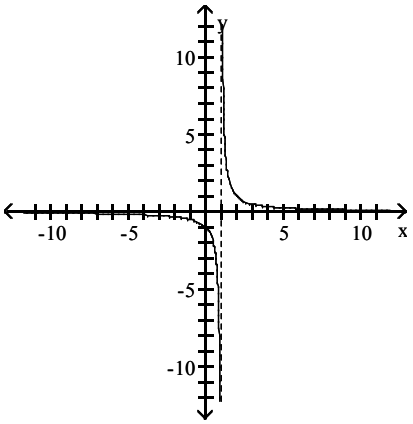
71) $f(x) = \frac{1}{x} - 1$ 71) _____



A)



B)



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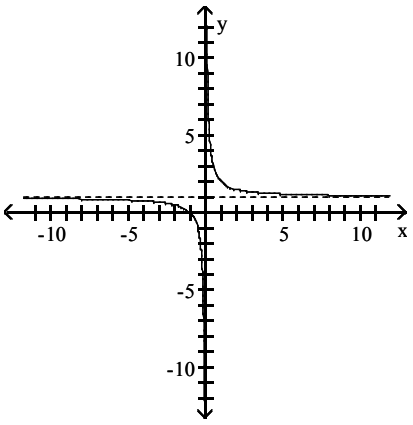

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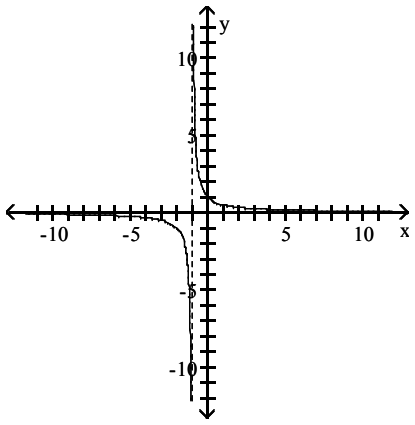
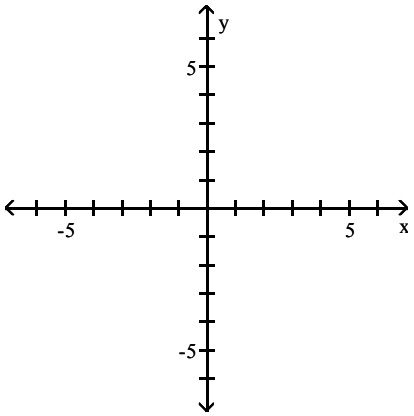
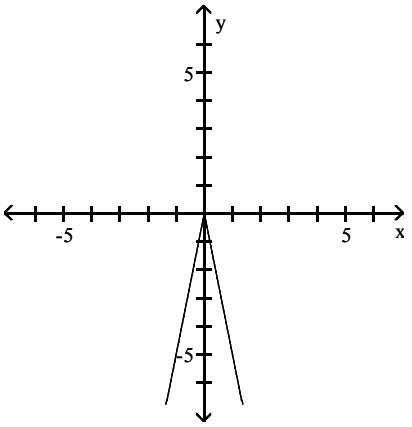


Objective: (3.4) Using Vertical Shifts to Graph Functions

72) $f(x) = \frac{1}{5}|x|$ 72) _____



A)



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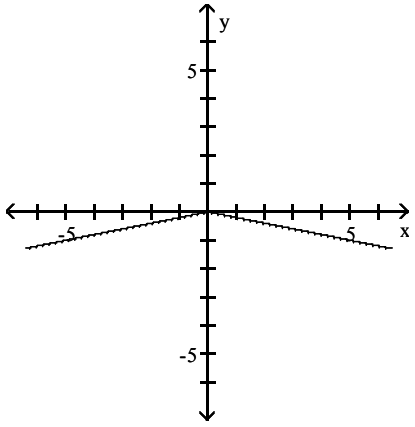
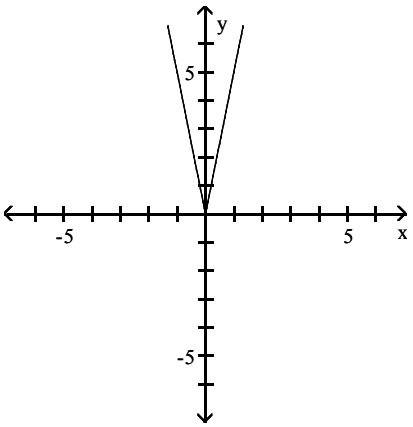
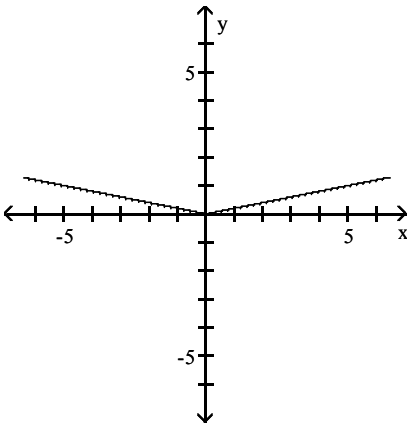


C)

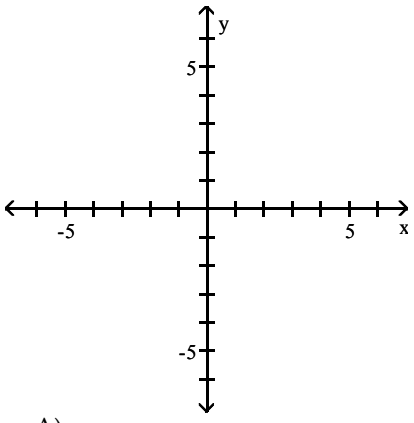


D)

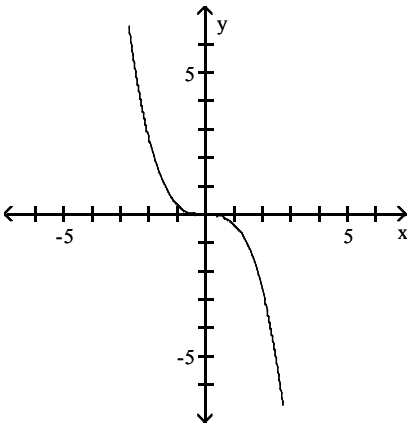


Objective: (3.4) Using Vertical Stretches and Compressions to Graph Functions

73) $f(x) = 3x^3$ 73) _____



A)



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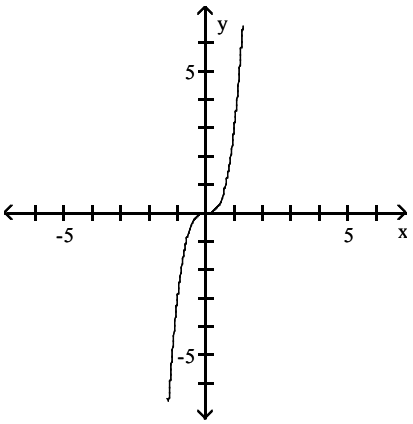
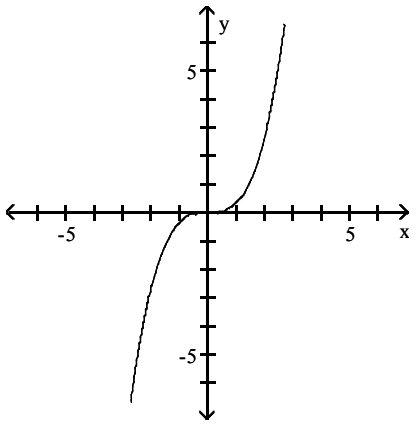
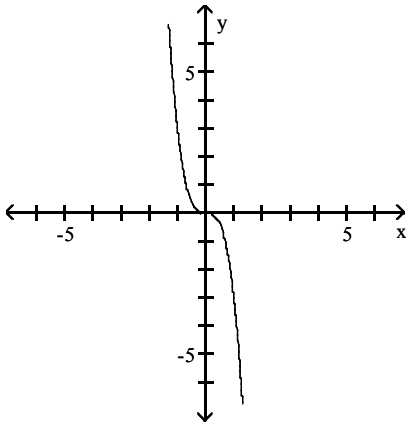


C)



D)



Objective: (3.4) Using Vertical Stretches and Compressions to Graph Functions

Find the domain of the composite function f ∘ g. Write the domain in interval notation.

74) $f(x) = 8x + 56,\ g(x) = x + 6$ 74) _____

A) $(-\infty, \infty)$ B) $(-\infty, -13) \cup (-13, \infty)$

C) $(-\infty, -7) \cup (-7, -6)\ (-6, \infty)$ D) $(-\infty, 13) \cup (13, \infty)$

Objective: (3.5) Determining the Domain of Composite Functions

Evaluate.

75) Find $(f - g)(-2)$ when $f(x) = 5x^2 + 1$ and $g(x) = x + 4$. 75) _____

A) 27 B) 19 C) -19 D) 15

Objective: (3.5) Evaluating a Combined Function

For the given functions f and g, find the requested function and state its domain. Write the domain in interval notation.

76) $f(x) = 7x - 8;\ g(x) = 2x - 7;$ Find $f - g$. 76) _____

A) $(f - g)(x) = 9x - 15; (-\infty, 1) \cup (1, \infty)$ B) $(f - g)(x) = 5x - 1; (-\infty, \infty)$

C) $(f - g)(x) = 5x - 15; (-\infty, 3) \cup (3, \infty)$ D) $(f - g)(x) = -5x + 1; (-\infty, \infty)$

Objective: (3.5) Finding Combined Functions and Their Domains

77) $f(x) = 3 - 2x;\ g(x) = -8x + 2;$ Find $f + g$. 77) _____

A) $(f + g)(x) = -10x + 5; (-\infty, \infty)$ B) $(f + g)(x) = 6x + 5; (-\infty, \frac{5}{6}] \cup [\frac{5}{6}, \infty)$

C) $(f + g)(x) = -5x; (-\infty, \infty)$ D) $(f + g)(x) = -8x + 3; (-\infty, \frac{3}{8}) \cup (\frac{3}{8}, \infty)$

Objective: (3.5) Finding Combined Functions and Their Domains

Find the intersection of the given intervals.

78) $(-10, 0) \cup [-2, 10]$ 78) _____

A) $[-2, 0)$ B) $(-10, 10]$ C) $(-10, -2]$ D) $(0, 10]$

Objective: (3.5) Finding the Intersection of Intervals

For the given functions f and g, find the requested composite function value.

79) $f(x) = \sqrt{x + 3},\ g(x) = 3x;$ Find $(f \circ g)(2)$. 79) _____

A) 3 B) $\sqrt{15}$ C) $3\sqrt{5}$ D) $3\sqrt{15}$

Objective: (3.5) Forming and Evaluating Composite Functions

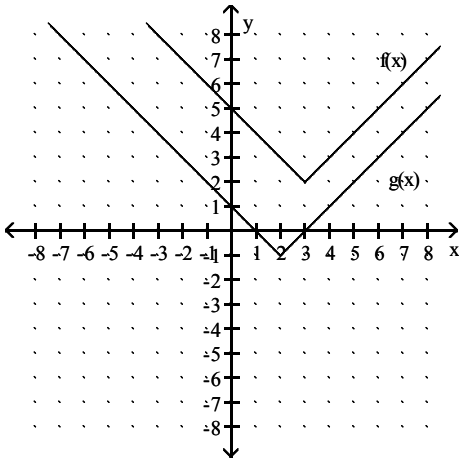
80) $f(x) = 4x + 2$, $g(x) = 2x^2 + 3$; Find $(g \circ g)(1)$. 80) _____

A) 26 B) 75 C) 53 D) 22

Objective: (3.5) Forming and Evaluating Composite Functions

Use the graph to evaluate the expression.

81) Find $(f \circ f)(-1)$ and $(g \circ g)(4)$. 81) _____



A) $(f \circ f)(-1) = 1$; $(g \circ g)(4) = 2$

B) $(f \circ f)(-1) = 5$; $(g \circ g)(4) = 0$

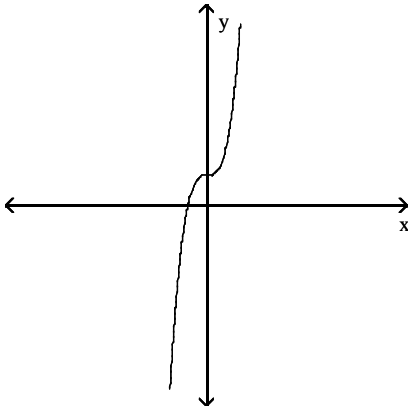
C) $(f \circ f)(-1) = 3$; $(g \circ g)(4) = 2$

D) $(f \circ f)(-1) = 7$; $(g \circ g)(4) = 0$

Objective: (3.5) Forming and Evaluating Composite Functions

Use the horizontal line test to determine whether the function is one–to–one.

82) 82) _____



A) Yes B) No

Objective: (3.6) Determining Whether a Function Is One–to–One Using the Horizontal Line Test

The function f is one–to–one. Find its inverse.

83) $f(x) = 5x^2 - 3$, $x \geq 0$ 83) _____

A) $f^{-1}(x) = \dfrac{5}{\sqrt{x+3}}$

B) $f^{-1}(x) = \sqrt{\dfrac{5}{x+3}}$

C) $f^{-1}(x) = \sqrt{\dfrac{x+3}{5}}$

D) $f^{-1}(x) = -\sqrt{\dfrac{x+3}{5}}$

Objective: (3.6) Finding the Inverse of a One–to–One Function

84) $f(x) = \dfrac{-7x - 9}{-2x + 6}$ 84) _____

A) $f^{-1}(x) = \dfrac{-6x - 9}{-2x + 7}$ B) $f^{-1}(x) = \dfrac{-7x - 9}{-2x + 6}$

C) $f^{-1}(x) = \dfrac{-2x + 7}{-6x - 9}$ D) $f^{-1}(x) = \dfrac{-7x - 7}{-2x + 6}$

Objective: (3.6) Finding the Inverse of a One–to–One Function

85) $f(x) = \sqrt[3]{x + 5}$ 85) _____

A) $f^{-1}(x) = x^3 - 5$ B) $f^{-1}(x) = x - 5$ C) $f^{-1}(x) = x^3 + 25$ D) $f^{-1}(x) = \dfrac{1}{x^3 - 5}$

Objective: (3.6) Finding the Inverse of a One–to–One Function

The function f is one–to–one. State the domain and the range of f and f^{-1}. Write the domain and range in set–builder notation.

86) $f(x) = \sqrt{3 - 4x}$ 86) _____

A) $f(x)$: D $= \left\{x \mid x \le \dfrac{3}{4}\right\}$, R is all real numbers;

$f^{-1}(x)$: D is all real numbers, R $= \left\{y \mid y \le \dfrac{3}{4}\right\}$

B) $f(x)$: D $= \left\{x \mid x \le \dfrac{3}{4}\right\}$, R $= \{y \mid y \ge 0\}$;

$f^{-1}(x)$: D $= \{x \mid x \ge 0\}$, R $= \left\{y \mid y \le \dfrac{3}{4}\right\}$

C) $f(x)$: D $= \left\{x \mid x \le \dfrac{3}{4}\right\}$, R $= \{y \mid y \le 0\}$;

$f^{-1}(x)$: D is all real numbers, R $= \left\{y \mid y \le \dfrac{3}{4}\right\}$

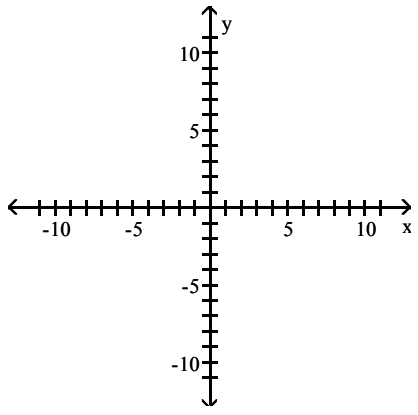
D) $f(x)$: D $= \{x \mid x \ge 0\}$, R $= \{y \mid y \ge 0\}$;

$f^{-1}(x)$: D $= \{x \mid x \ge 0\}$, R $= \left\{y \mid y \ge \dfrac{3}{4}\right\}$

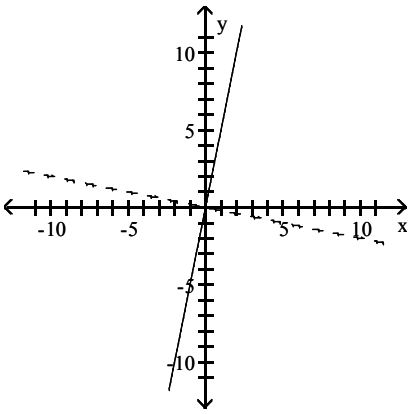
Objective: (3.6) Finding the Inverse of a One–to–One Function

Graph the function as a solid line or curve and its inverse as a dashed line or curve on the same axes.

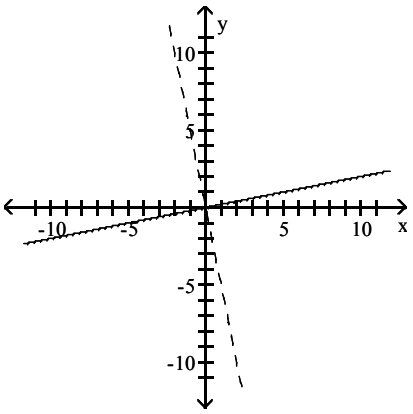
87) $f(x) = 5x$ 87) _____



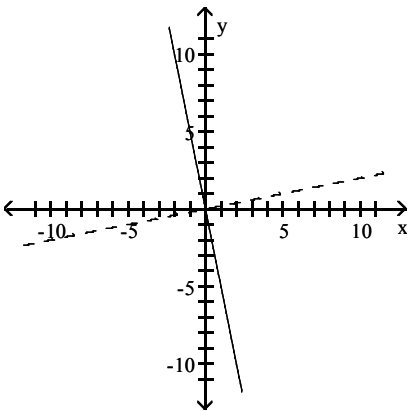
A)



B)



C)



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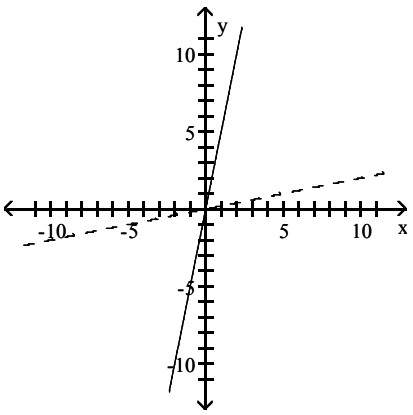


Objective: (3.6) Sketching the Graphs of Inverse Functions

Decide whether or not the functions are inverses of each other.

88) $f(x) = \frac{2}{x+4}$, $g(x) = \frac{4x+2}{x}$ 88) _____

A) Yes B) No

Objective: (3.6) Understanding and Verifying Inverse Functions

89) $f(x) = \sqrt{x+3}, x \geq -3$; $g(x) = x^2 + 3$ 89) _____

A) Yes B) No

Objective: (3.6) Understanding and Verifying Inverse Functions

Determine whether the function is one–to–one.

90) $h(x) = \frac{1}{6}x - \frac{7}{6}$ 90) _____

A) One–to–one B) Not one–to–one

Objective: (3.6) Understanding the Definition of a One–to–One Function

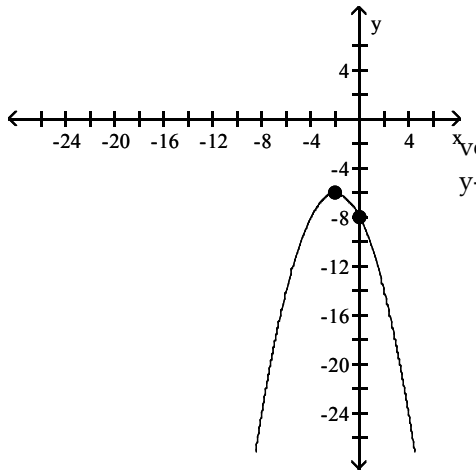
91) $f(x) = |x - 3|$ 91) _____

A) One–to–one B) Not one–to–one

Objective: (3.6) Understanding the Definition of a One–to–One Function

Analyze the graph and write the equation of the function it represents in standard form $f(x) = a(x - h)^2 + k$.

92) 92) _____



vertex: (-2, -6)
y–intercept: (0, - 8)

A) $y = \frac{1}{2}(x + 2)^2 + 6$

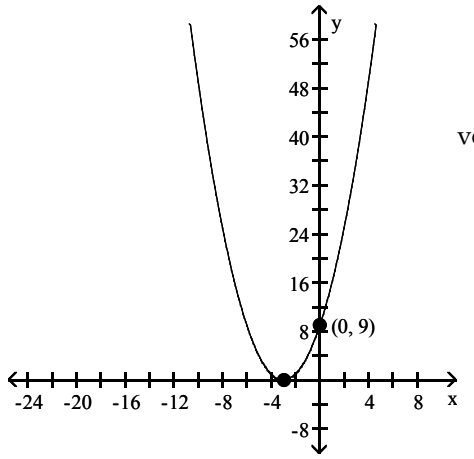
B) $y = -2(x + 2)^2 - 6$

C) $y = 2(x + 2)^2 + 6$

D) $y = -\frac{1}{2}(x + 2)^2 - 6$

Objective: (4.1) Determining the Equation of a Quadratic Function Given Its Graph

93) 93) _____



vertex: (–3, 0)

A) $f(x) = (x + 3)^2$ B) $f(x) = -(x + 3)^2$ C) $f(x) = -(x - 3)^2$ D) $f(x) = (x - 3)^2$

Objective: (4.1) Determining the Equation of a Quadratic Function Given Its Graph

First rewrite the quadratic function in standard form by completing the square, then find any x –intercepts and any y–intercepts.

94) $f(x) = -x^2 + 17x - 72$ 94) _____

A) No x–intercepts; y–intercept: -72

B) x–intercepts: 8 and 9; y–intercept: -72

C) x–intercepts: 8 and -9; y–intercept: 17

D) x–intercepts: -8 and -9; y–intercept: 72

Objective: (4.1) Graphing Quadratic Functions by Completing the Square

Find the range of the quadratic function in interval notation.

95) $f(x) = x^2 + 8x + 6$ 95) _____

A) $(-\infty, -10]$ B) $(-\infty, -42]$ C) $[4, \infty)$ D) $[-10, \infty)$

Objective: (4.1) Graphing Quadratic Functions by Completing the Square

Rewrite the quadratic function in standard form by completing the square.

96) $f(x) = x^2 + 10x + 33$ 96) _____

A) $f(x) = (x - 5)^2 - 8$ B) $f(x) = (x + 5)^2 + 8$

C) $f(x) = (x - 5)^2 + 8$ D) $f(x) = (x + 5)^2 - 8$

Objective: (4.1) Graphing Quadratic Functions by Completing the Square

Find the coordinates of the vertex of the quadratic function.

97) $f(x) = x^2 - 6x - 9$ 97) _____

A) (-3, 18) B) (-6, 63) C) (3, -36) D) (3, -18)

Objective: (4.1) Graphing Quadratic Functions by Completing the Square

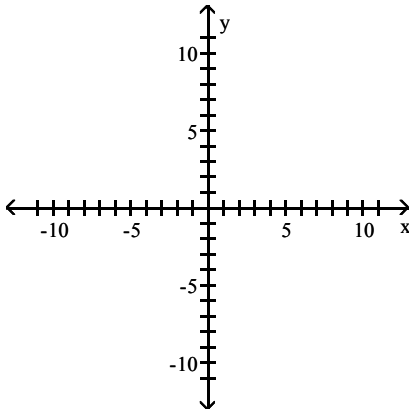
98) $f(x) = -4x^2 - 8x - 9$ 98) _____

A) (2, -41) B) (1, -21) C) (-2, -17) D) (-1, –5)

Objective: (4.1) Graphing Quadratic Functions by Completing the Square

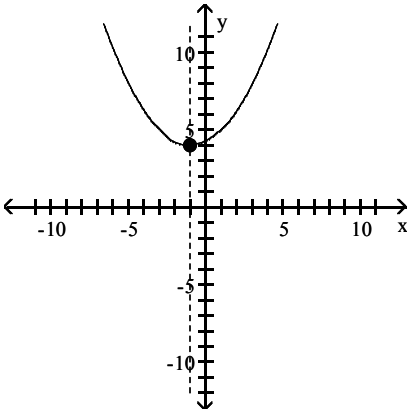
Graph the quadratic function using its vertex, axis of symmetry, and intercepts.

99) $f(x) = 4x^2 - 8x + 8$ 99) _____



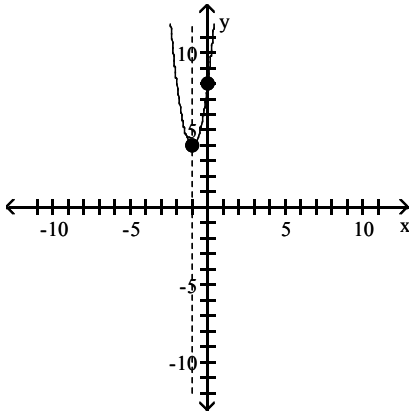
A) vertex (–1, 4)

intercept $\left(0, \frac{17}{4}\right)$

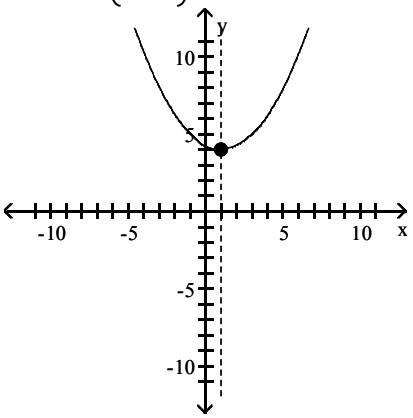


B) vertex (–1, 4)

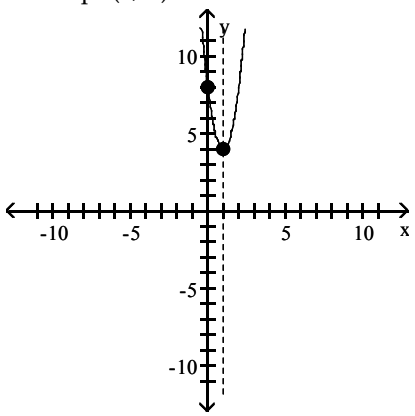
intercept (0, 8)



C) vertex (1, 4)
intercept $\left(0, \frac{17}{4}\right)$



D) vertex (1, 4)
intercept (0, 8)



Objective: (4.1) Graphing Quadratic Functions Using the Vertex Formula

Use the quadratic function to determine if the function has a maximum or minimum value and then find this maximum or minimum value.

100) $f(x) = 3x^2 + 3x - 9$ 100) _____

A) minimum at $\left(-\frac{39}{4}, -\frac{1}{2}\right)$

B) maximum at $\left(-\frac{39}{4}, -\frac{1}{2}\right)$

C) minimum at $\left(-\frac{1}{2}, -\frac{39}{4}\right)$

D) maximum at $\left(-\frac{1}{2}, -\frac{39}{4}\right)$

Objective: (4.1) Graphing Quadratic Functions Using the Vertex Formula

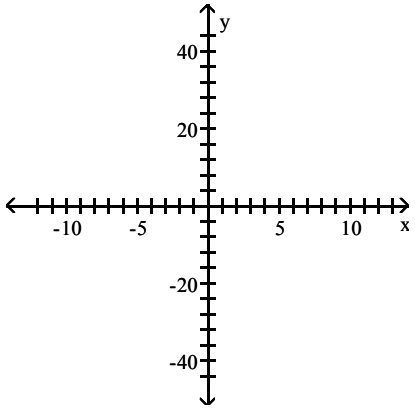
101) $f(x) = -2x^2 - 12x - 27$ 101) _____

A) maximum at (9, 3)
B) minimum at (0, 3)
C) minimum at (9, 0)
D) maximum at (-3, -9)

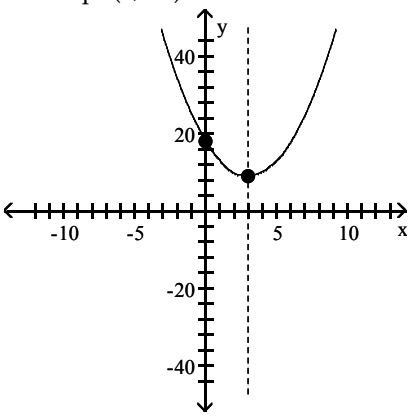
Objective: (4.1) Graphing Quadratic Functions Using the Vertex Formula

Graph the quadratic function using its vertex, axis of symmetry, and intercepts.

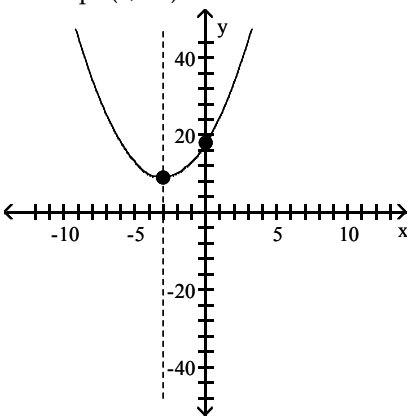
102) $f(x) = x^2 - 6x$ 102) _____



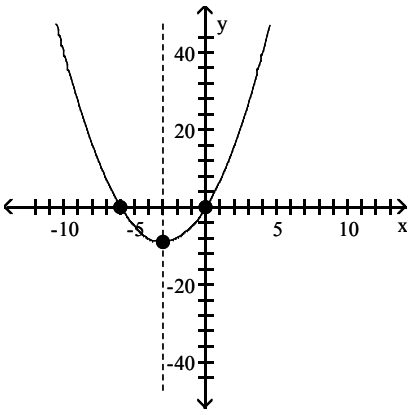
A) vertex (3, 9)
intercept (0, 18)



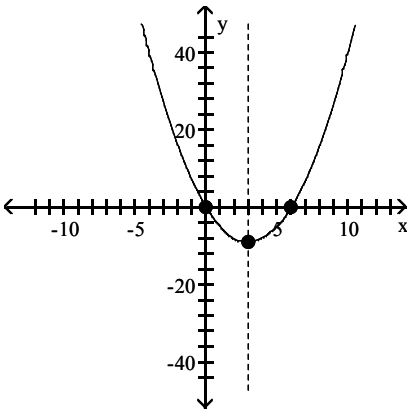
B) vertex (-3, 9)
intercept (0, 18)



C) vertex (-3, -9)
intercepts (0, 0), (-6, 0)



D) vertex (3, -9)
intercepts (0, 0), (6, 0)



Objective: (4.1) Graphing Quadratic Functions Using the Vertex Formula

Find the range of the quadratic function in interval notation.

103) $f(x) = -7(x - 3)^2 - 6$ 103) _____

A) $(-\infty, 3]$ B) $[-6, \infty)$ C) $(-\infty, -6]$ D) $[-3, \infty)$

Objective: (4.1) Graphing Quadratic Functions Written in Standard Form

Find the axis of symmetry of the quadratic function.

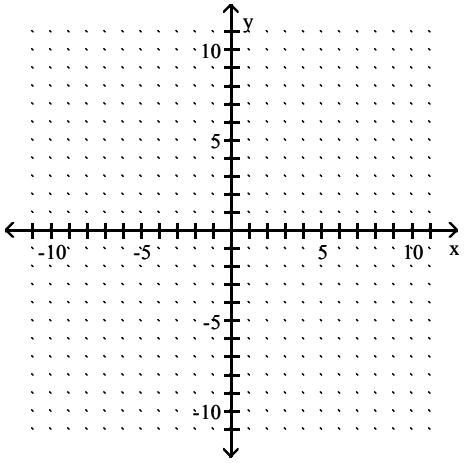
104) $f(x) = -7(x - 2)^2 - 5$ 104) _____

A) $x = -7$ B) $x = -2$ C) $x = -5$ D) $x = 2$

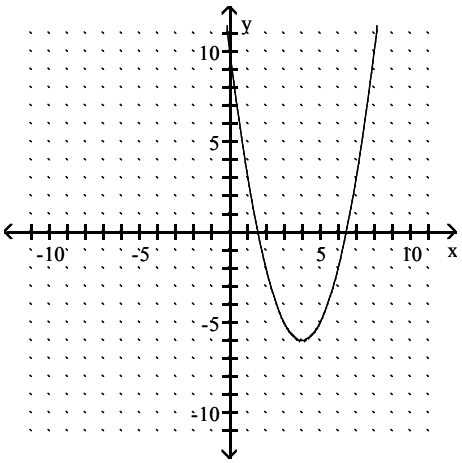
Objective: (4.1) Graphing Quadratic Functions Written in Standard Form

Sketch the graph of the quadratic function.

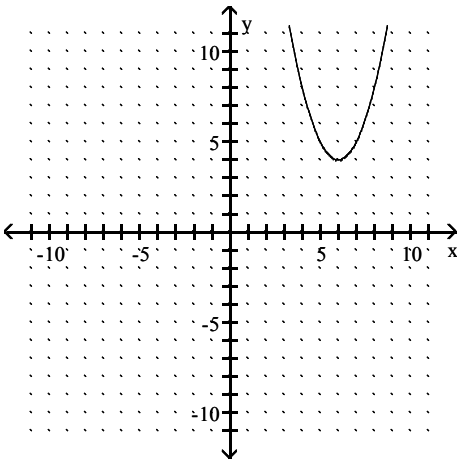
105) $f(x) = (x + 4)^2 + 6$ 105) _____



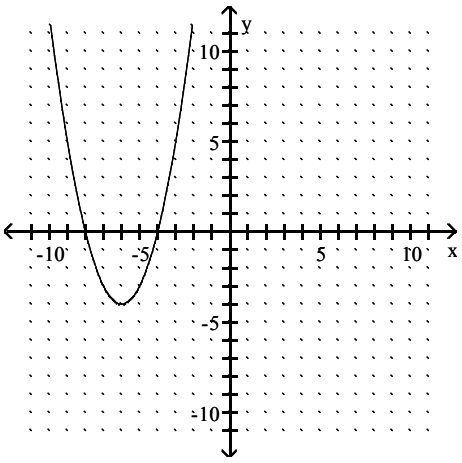
A)



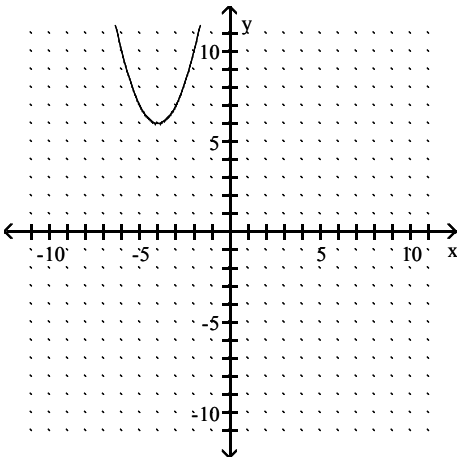
B)



C)



D)



Objective: (4.1) Graphing Quadratic Functions Written in Standard Form

Find the axis of symmetry of the quadratic function.

106) $f(x) = (x + 5)^2 + 7$ 106) _____

A) $y = -7$ B) $x = 5$ C) $x = -5$ D) $y = 7$

Objective: (4.1) Graphing Quadratic Functions Written in Standard Form

Without graphing, determine whether the graph of the quadratic function opens up or opens down.

107) $f(x) = -3x^2 - 4x + 5$ 107) _____

A) opens down B) opens up

Objective: (4.1) Understanding the Definition of a Quadratic Function and Its Graph

Solve the problem.

108) A developer wants to enclose a rectangular grassy lot that borders a city street for parking. If the developer has 352 feet of fencing and does not fence the side along the street, what is the largest area that can be enclosed? 108) _____

A) 23,232 ft^2 B) 30,976 ft^2 C) 15,488 ft^2 D) 7744 ft^2

Objective: (4.2) Maximizing Area Functions

109) The manufacturer of a CD player has found that the revenue R (in dollars) is $R(p) = -5p^2 + 1590p$, when the unit price is p dollars. If the manufacturer sets the price p to maximize revenue, what is the maximum revenue to the nearest whole dollar? 109) _____

A) $126,405 B) $252,810 C) $1,011,240 D) $505,620

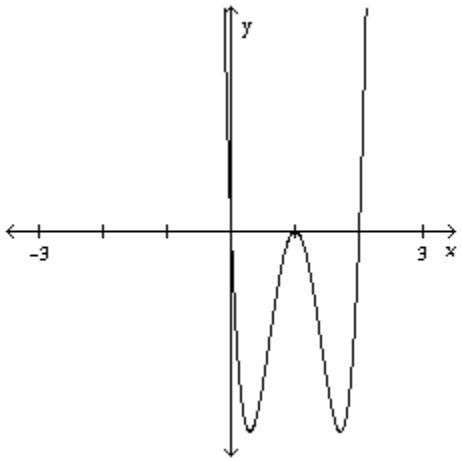
Objective: (4.2) Maximizing Functions in Economics

110) A projectile is fired from a cliff 600 feet above the water at an inclination of 45° to the horizontal, with a muzzle velocity of 120 feet per second. The height h of the projectile above the water is given by $h(x) = \frac{-32x^2}{(120)^2} + x + 600$, where x is the horizontal distance of the projectile from the base of the cliff. How far from the base of the cliff is the height of the projectile a maximum? 110) _____

A) 712.5 ft B) 225 ft C) 112.5 ft D) 937.5 ft

Objective: (4.2) Maximizing Projectile Motion Functions

111) Which of the following polynomial functions might have the graph shown in the illustration below? 111) _____

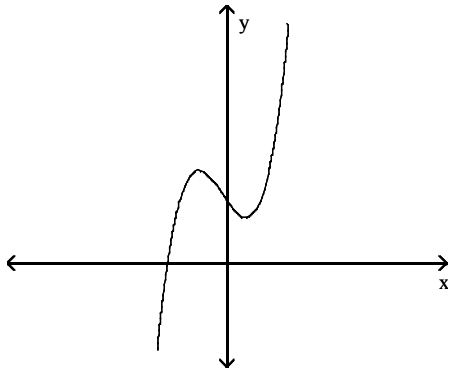


A) $f(x) = x(x - 2)^2(x - 1)$ B) $f(x) = x^2(x - 2)^2(x - 1)^2$

C) $f(x) = x^2(x - 2)(x - 1)$ D) $f(x) = x(x - 2)(x - 1)^2$

Objective: (4.3) Determining a Possible Equation of a Polynomial Function Given Its Graph

Use the end behavior of the graph of the polynomial function to determine whether the degree is even or odd and determine whether the leading coefficient is positive or negative.

112) 

112) _____

A) even; positive B) odd; positive C) odd; negative D) even; negative

Objective: (4.3) Determining the End Behavior of Polynomial Functions

Find the x– and y–intercepts of f.

113) $f(x) = x^2(x - 2)(x - 1)$ 113) _____

A) x–intercepts: 0, 2, 1; y–intercept: 2 B) x–intercepts: 0, 2, 1; y–intercept: 0

C) x–intercepts: 0, –2, –1; y–intercept: 2 D) x–intercepts: 0, –2, –1; y–intercept: 0

Objective: (4.3) Determining the Intercepts of a Polynomial Function

Determine the real zeros of the polynomial and their multiplicities. Then decide whether the graph touches or crosses the x–axis at each zero.

114) $f(x) = 3(x^2 + 5)(x - 4)^2$ 114) _____

A) 4, multiplicity 2, crosses x–axis

B) 4, multiplicity 2, touches x–axis

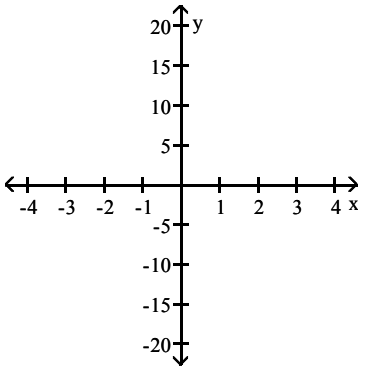
C) -5, multiplicity 1, crosses x–axis; 4, multiplicity 2, touches x–axis

D) -5, multiplicity 1, touches x–axis; 4, multiplicity 2, crosses x–axis

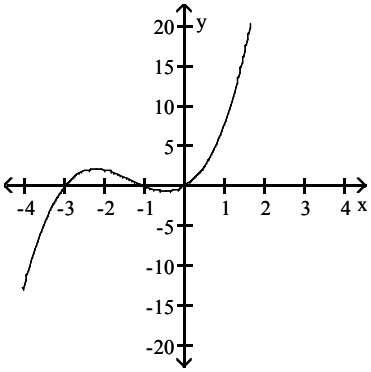
Objective: (4.3) Determining the Real Zeros of Polynomial Functions and Their Multiplicities

Graph the polynomial function.

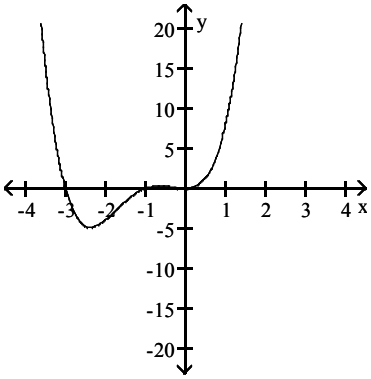
115) $f(x) = -x^2(x + 1)(x + 3)$ 115) _____



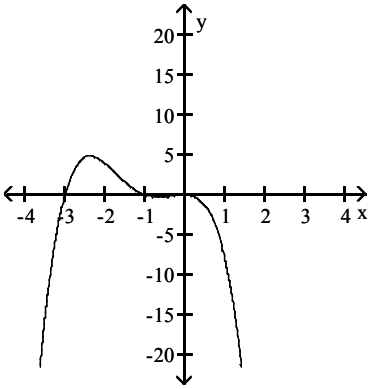
A)



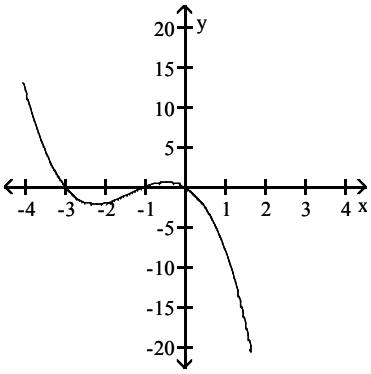
B)



C)

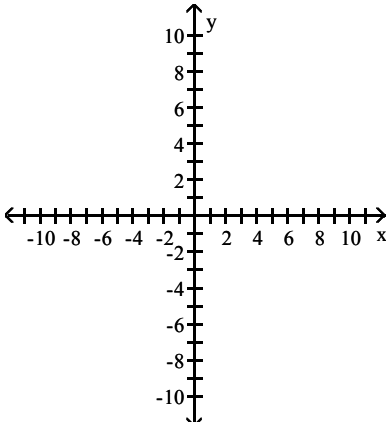


D)

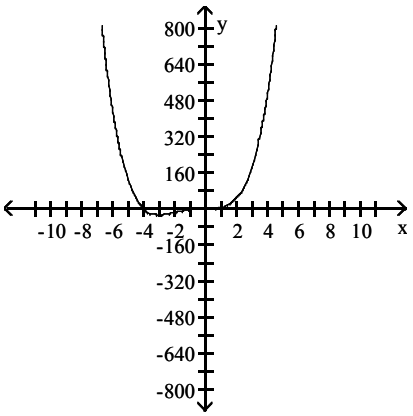


Objective: (4.3) Sketching the Graph of a Polynomial Function

116) $f(x) = x^4 - 4x^2$ 116) _____



A)



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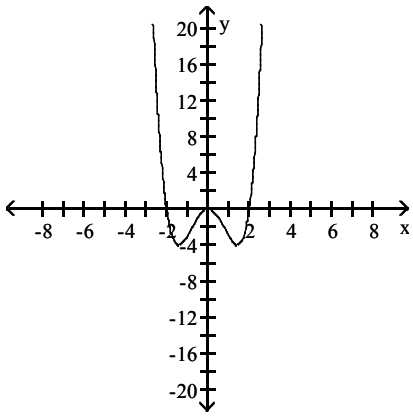
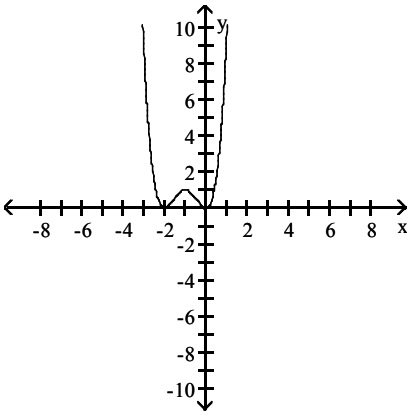
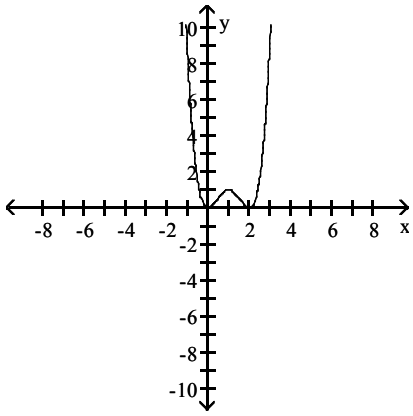


C)



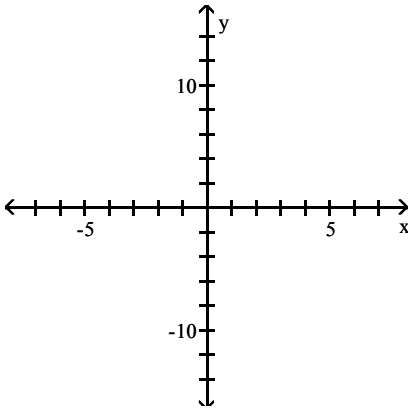
D)



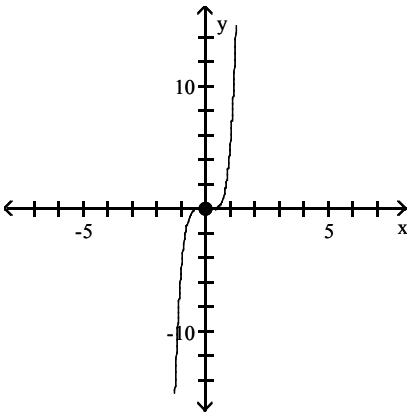
Objective: (4.3) Sketching the Graph of a Polynomial Function

Use the graph of a power function and transformations to sketch the graph of the polynomial function.

117) $f(x) = -\frac{1}{5}x^5$ 117) _____



A)



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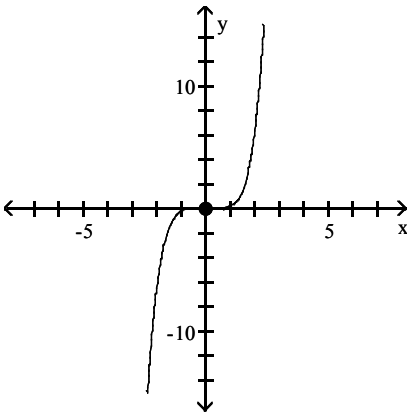
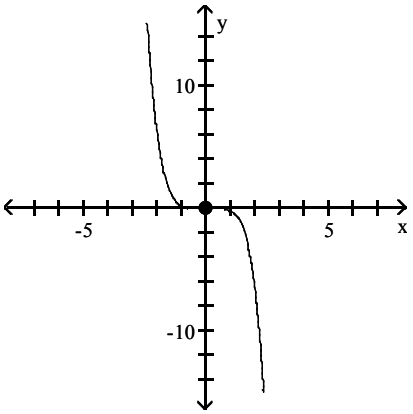
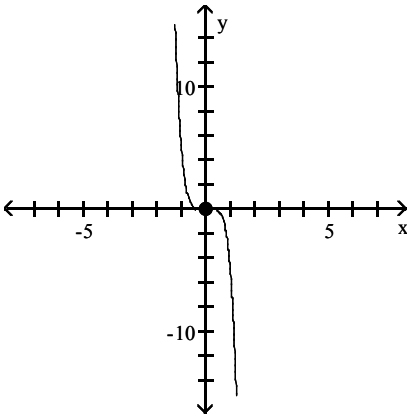


C)

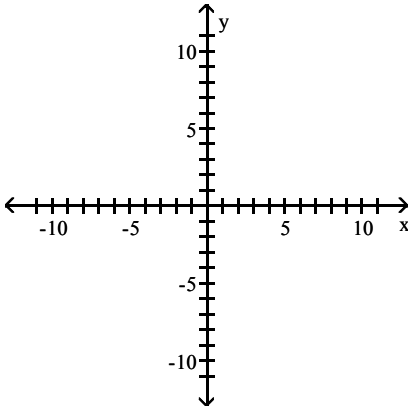


D)

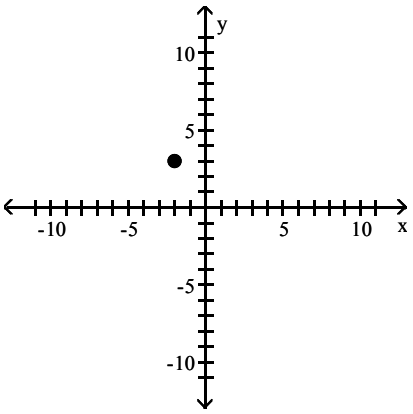


Objective: (4.3) Sketching the Graphs of Power Functions

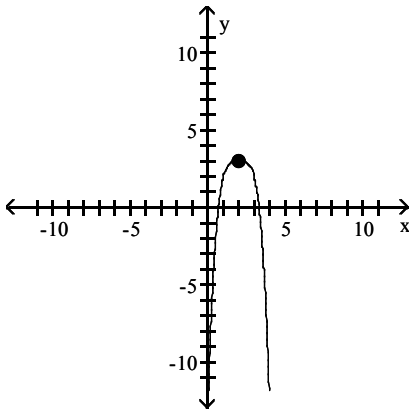
118) $f(x) = 3 - (x + 2)^4$ 118) _____



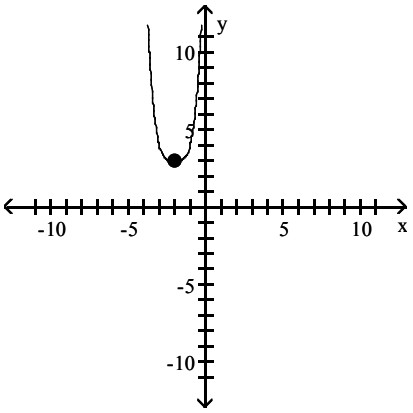
A)



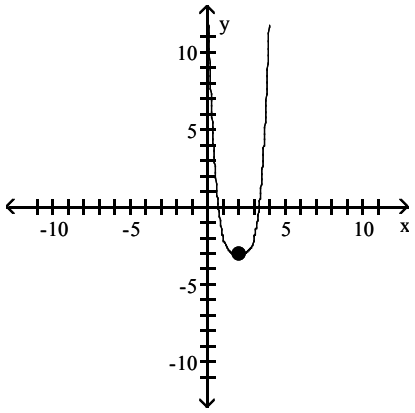
B)



C)

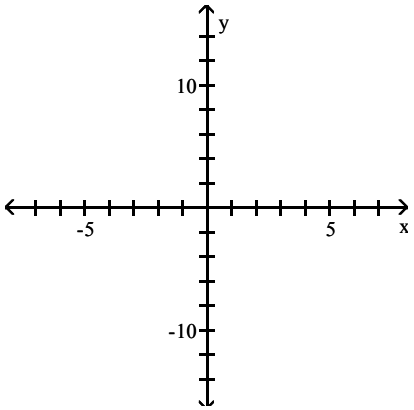


D)

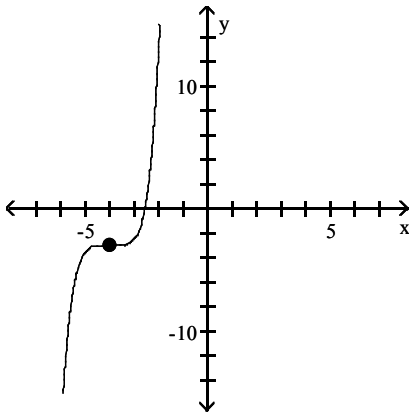


Objective: (4.3) Sketching the Graphs of Power Functions

119) $f(x) = \frac{1}{2}(x - 4)^5 + 3$ 119) _____



A)



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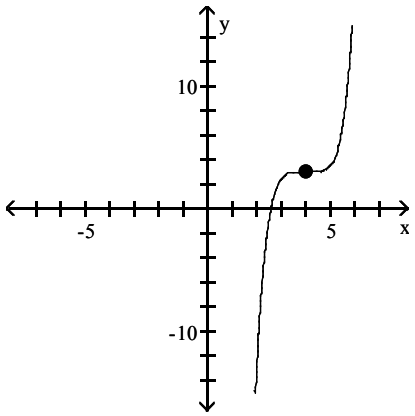
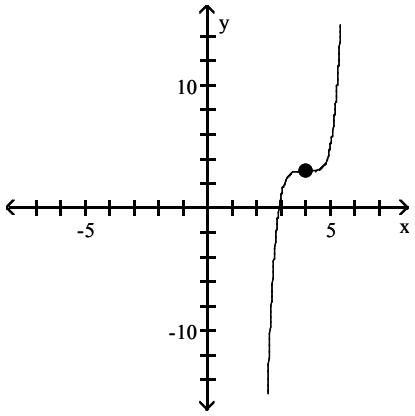
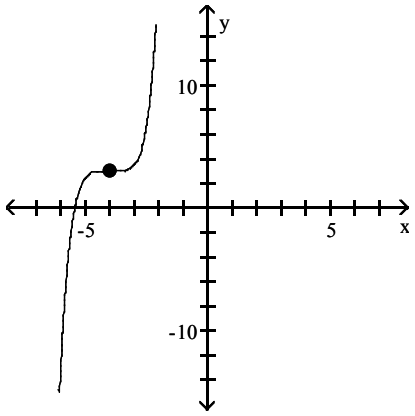


C)



D)



Objective: (4.3) Sketching the Graphs of Power Functions

State whether the function is a polynomial function or not. If it is, give its degree.

120) $f(x) = 12x^4 - 2x^3 + 2$ 120) _____

A) Yes; degree 8
B) Yes; degree 4
C) Not a polynomial
D) Yes; degree 7

Objective: (4.3) Understanding the Definition of a Polynomial Function

Find the domain of the rational function.

121) $f(x) = \dfrac{2x^2 - 4}{3x^2 + 6x - 45}$ 121) _____

A) all real numbers
B) $\{x \mid x \neq 3, x \neq -5\}$
C) $\{x \mid x \neq -3, x \neq 5\}$
D) $\{x \mid x \neq 3, x \neq -3, x \neq -5\}$

Objective: (4.6) Finding the Domain and Intercepts of Rational Functions

Give the equation of the horizontal asymptote, if any, of the function.

122) $f(x) = \dfrac{4x - 9}{x - 2}$ 122) _____

A) $y = 0$
B) $y = 2$
C) $y = 4$
D) none

Objective: (4.6) Identifying Horizontal Asymptotes

Give the equation of the slant asymptote, if any, of the function.

123) $f(x) = \dfrac{x^2 + 5x - 2}{x - 7}$ 123) _____

A) none B) $x = y + 12$ C) $y = x + 12$ D) $y = x - 2$

Objective: (4.6) Identifying Slant Asymptotes

Find the vertical asymptotes, if any, of the graph of the rational function.

124) $f(x) = \dfrac{x}{x + 9}$ 124) _____

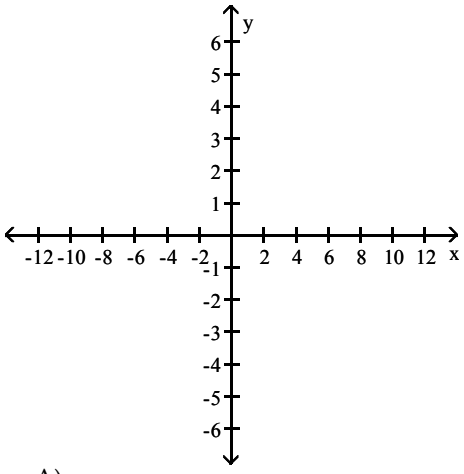
A) $x = 0$ and $x = -9$ B) no vertical asymptote

C) $x = -9$ D) $x = 0$ and $x = 9$

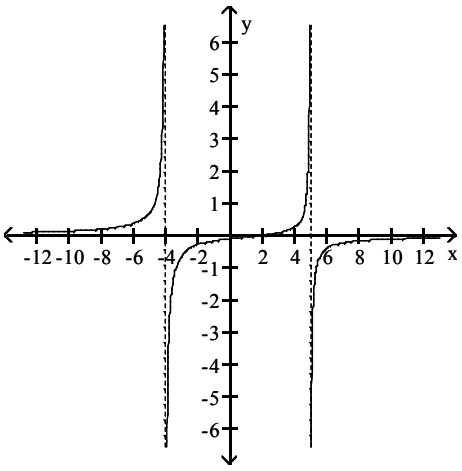
Objective: (4.6) Identifying Vertical Asymptotes

Graph the function.

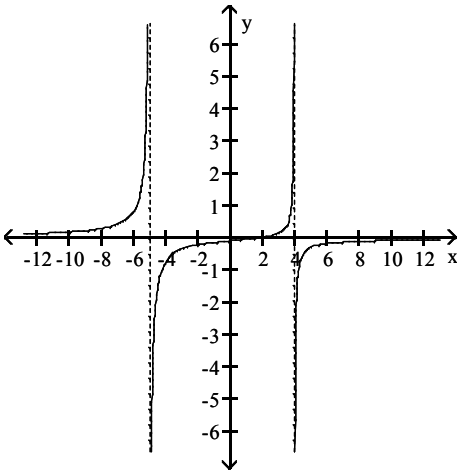
125) $f(x) = \dfrac{x - 2}{x^2 - x - 20}$ 125) _____



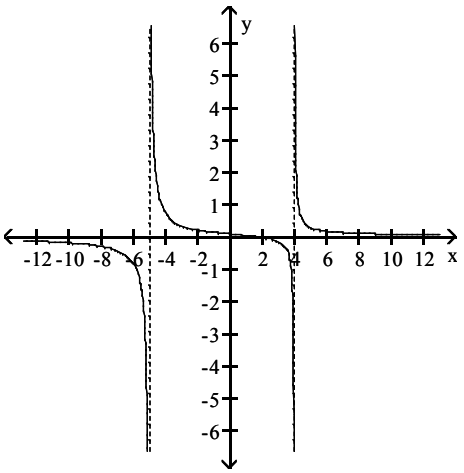
A)



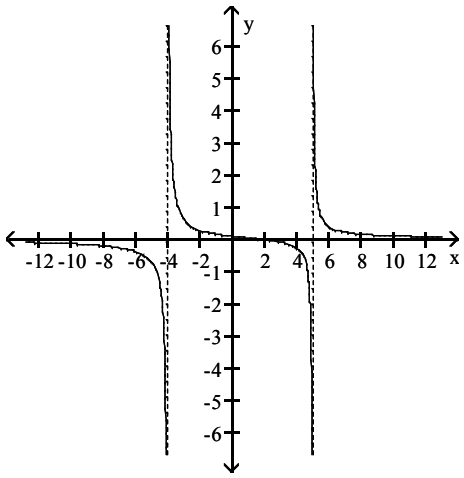
B)



C)

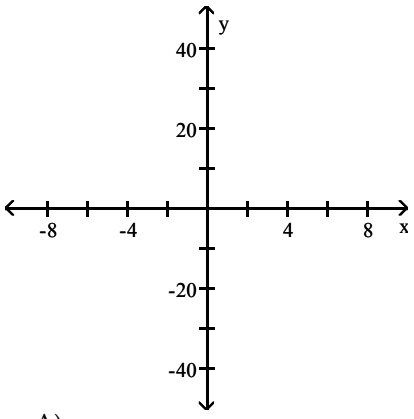


D)

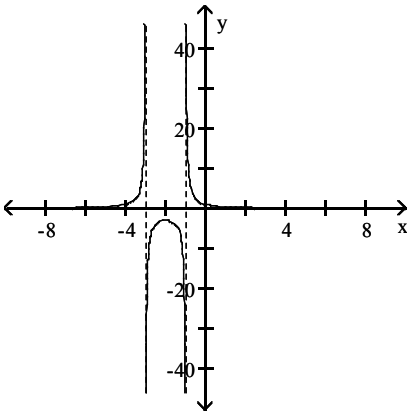


Objective: (4.6) Sketching Rational Functions

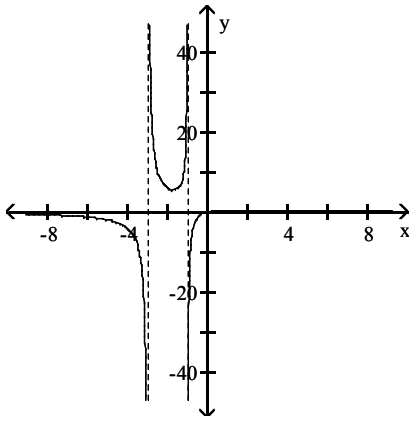
126) $f(x) = \dfrac{3x}{(x+1)(x+3)}$ 126) _____



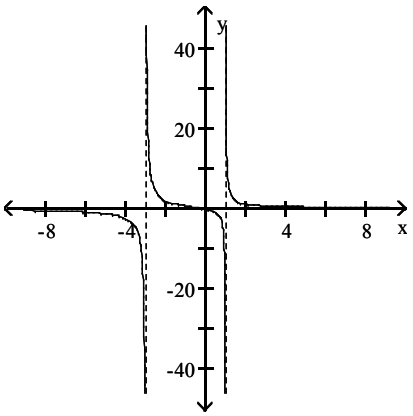
A)



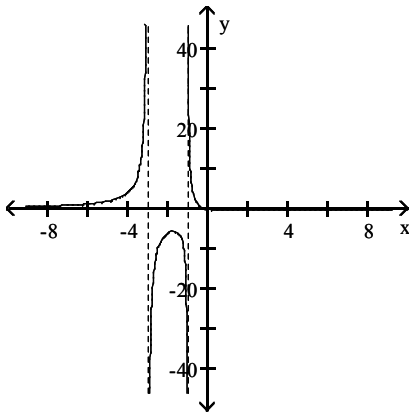
B)



C)



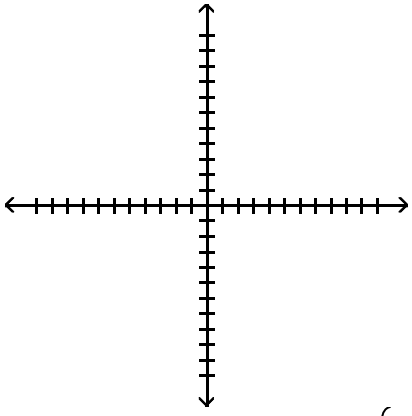
D)



Objective: (4.6) Sketching Rational Functions

For the following rational function, identify the coordinates of all removable discontinuities and sketch the graph. Identify all intercepts and find the equations of all asymptotes.

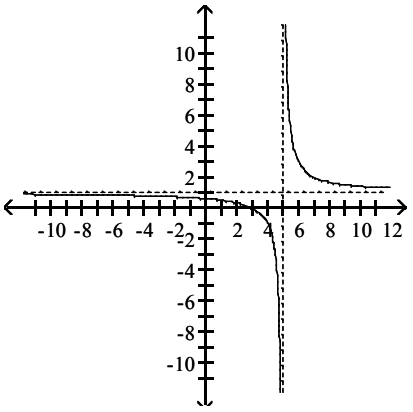
127) $f(x) = \dfrac{(x^2 - 9)(x + 5)}{(x^2 - 25)(x + 3)}$ 127) _____



A) removable discontinuities: $\left(-5, \frac{4}{5}\right), \left(-3, \frac{3}{4}\right)$;

x–intercept: (3, 0), y–intercept: $\left(0, \frac{3}{5}\right)$;

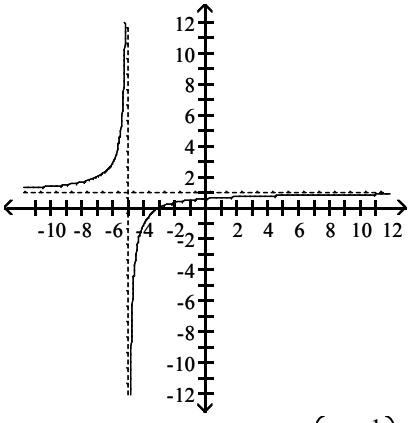
asymptotes: x = 5, y = 1



B) removable discontinuity at (–3, 0);

x–intercept: (–3, 0), y–intercept: $\left(0, \frac{3}{5}\right)$;

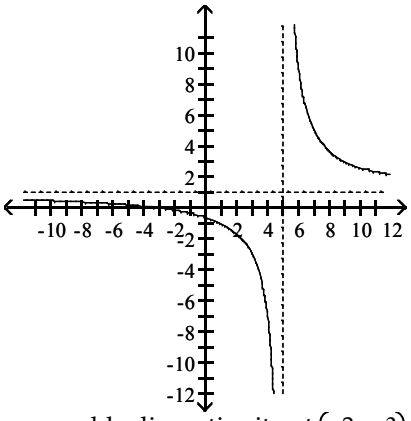
asymptotes: x = -5, y = 1



C) removable discontinuities: $\left(-5, \frac{1}{5}\right)$, (–3, 0);

x–intercept: (–3, 0), y–intercept: $\left(0, -\frac{3}{5}\right)$;

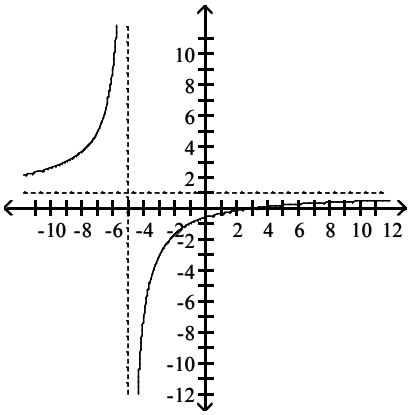
asymptotes: x = 5, y = 1



D) removable discontinuity at $(-3, -3)$;

x–intercept: (3, 0), y–intercept: $\left(0, -\frac{3}{5}\right)$;

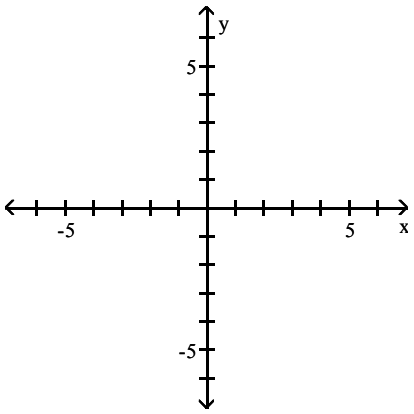
asymptotes: x = -5, y = 1



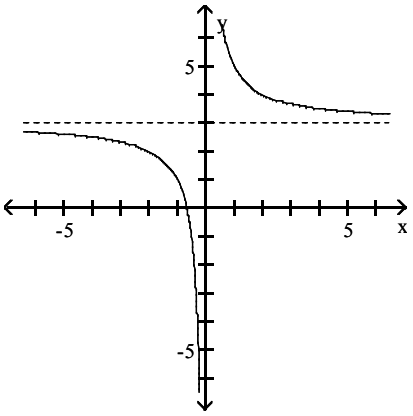
Objective: (4.6) Sketching Rational Functions Having Removable Discontinuities

Graph the function using transformations.

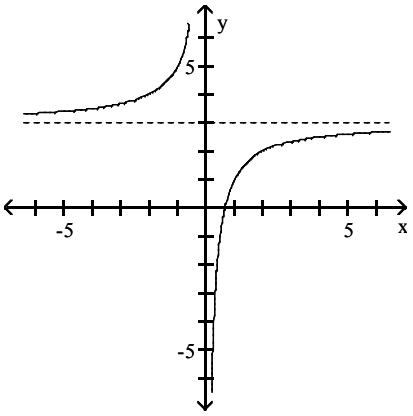
128) $f(x) = \frac{-2}{x+3}$ 128) _____



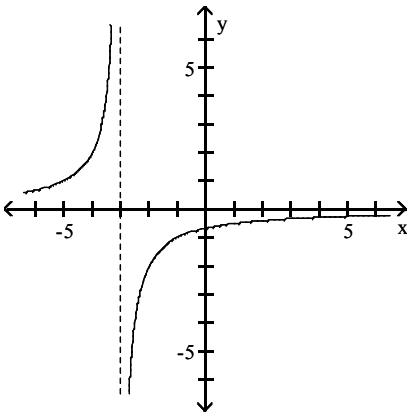
A)



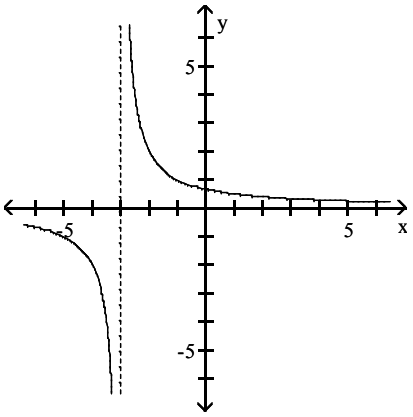
B)



C)



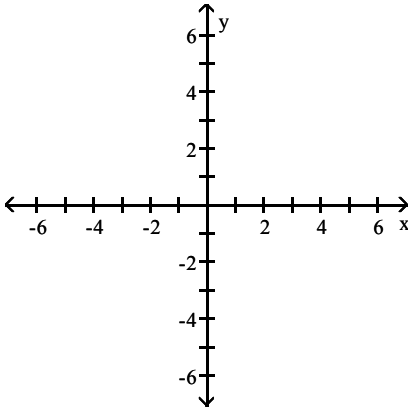
D)



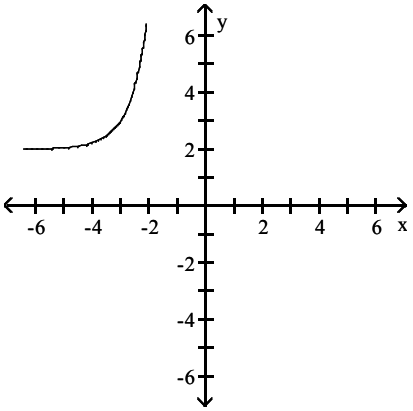
Objective: (4.6) Using Transformations to Sketch the Graphs of Rational Functions

Use transformations to graph the function.

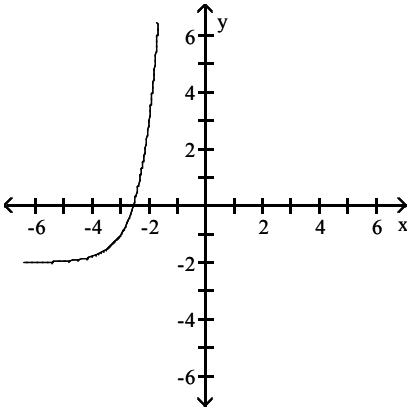
129) $f(x) = 5^{(x - 3)} - 2$ 129) _____



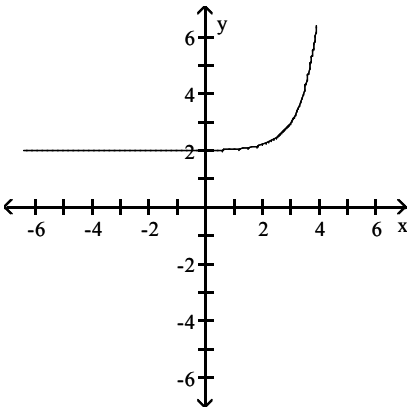
A)



B)



C)



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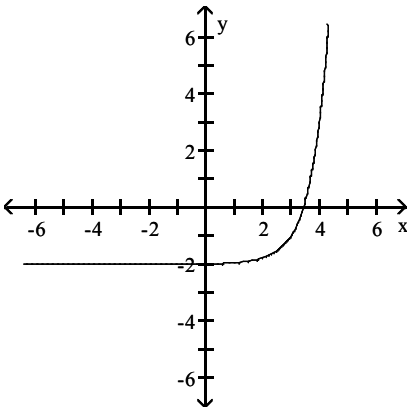
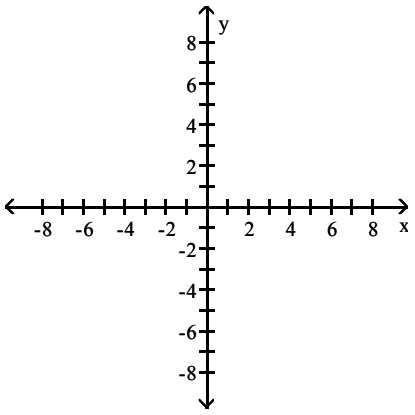
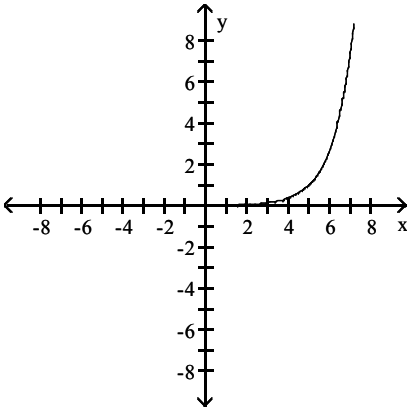


Objective: (5.1) Sketching the Graphs of Exponential Functions Using Transformations

130) $f(x) = e^x + 5$ 130) _____



A)



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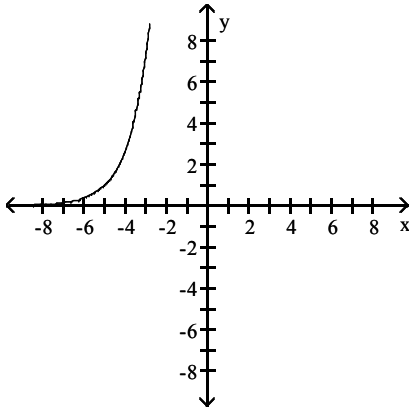

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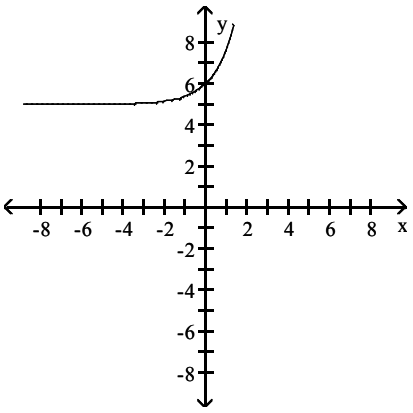

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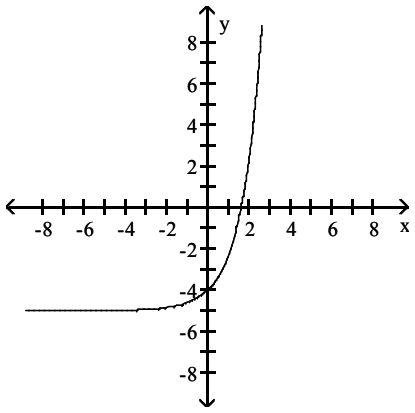


Objective: (5.1) Sketching the Graphs of Exponential Functions Using Transformations

Solve the problem.

131) An original investment of $7000 earns 7% interest compounded continuously. What will the investment be worth in 3 years? Round to the nearest cent. 131) _____

A) $8575.30 B) $8470.00 C) $8735.75 D) $8635.75

Objective: (5.1) Solving Applications of Exponential Functions

132) Suppose that $6000 is invested at an interest rate of 5.2% per year, compounded continuously. What is the balance after 2 years?Round to the nearest cent. 132) _____

A) $6312.00 B) $6757.60 C) $6624.00 D) $6657.60

Objective: (5.1) Solving Applications of Exponential Functions

133) A rumor is spread at an elementary school with 1200 students according to the model $N = 1200(1 - e^{-0.16d})$ where N is the number of students who have heard the rumor and d is the number of days that have elapsed since the rumor began. How many students will have heard the rumor after 5 days? 133) _____

A) 661 students B) 689 students C) 1006 students D) 1063 students

Objective: (5.1) Solving Applications of Exponential Functions

Solve the equation.

134) $3^{6 - 3x} = \frac{1}{27}$ 134) _____

A) $\left\{\frac{1}{9}\right\}$ B) {3} C) {-3} D) {9}

Objective: (5.1) Solving Exponential Equations by Relating the Bases

135) $3^{(10 - 2x)} = 81$ 135) _____

A) {3} B) {-3} C) {4} D) {2}

Objective: (5.1) Solving Exponential Equations by Relating the Bases

Evaluate the logarithm without the use of a calculator.

136) $\log_7 \sqrt{7}$ 136) _____

A) $\frac{1}{7}$ B) 7 C) $\frac{1}{2}$ D) 1

Objective: (5.2) Evaluating Logarithmic Expressions

Find the domain of the function.

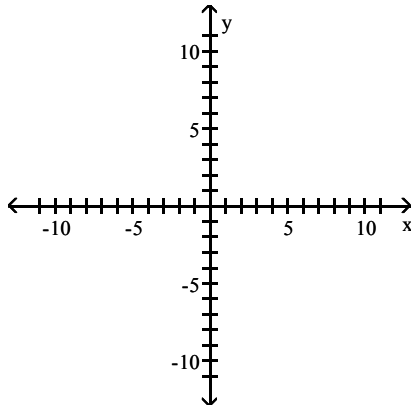
137) $f(x) = \ln(-4 - x)$ 137) _____

A) $(-\infty, -4)$ B) $(-\infty, 4)$ C) $(-4, \infty)$ D) $(4, \infty)$

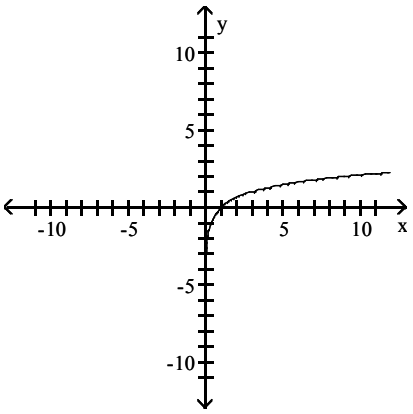
Objective: (5.2) Finding the Domain of Logarithmic Functions

Graph the function.

138) $f(x) = \log_3 x + 1$ 138) _____



A)



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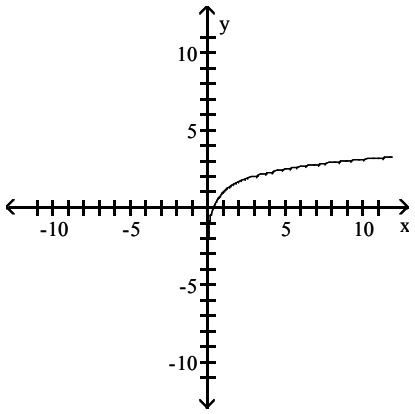

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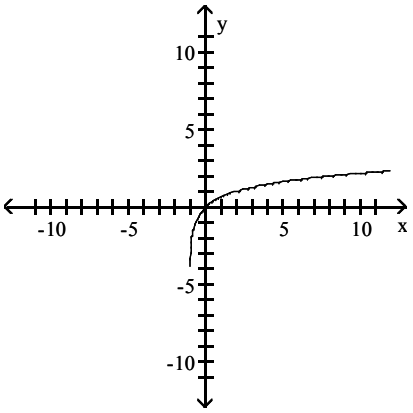
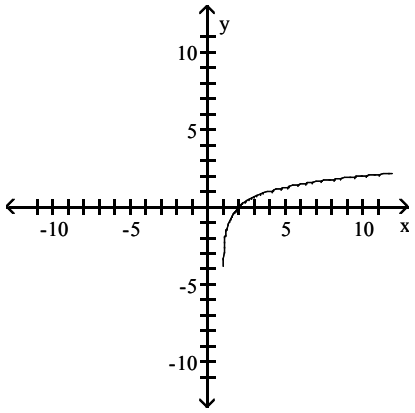
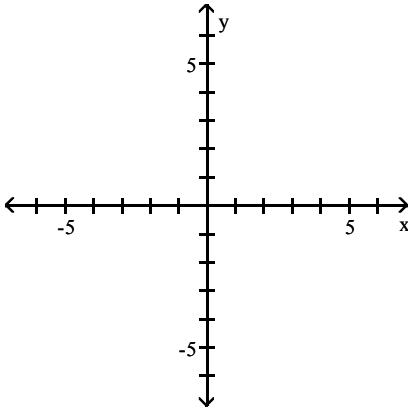


D)

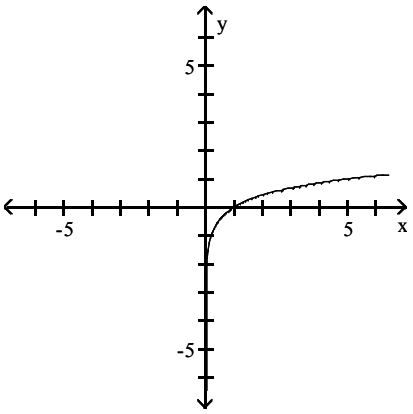


Objective: (5.2) Sketching the Graphs of Logarithmic Functions Using Transformations

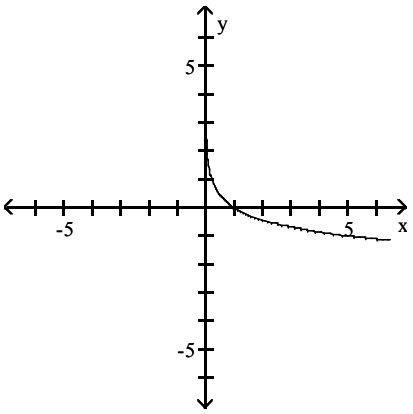
139) $f(x) = \log_5 x$ 139) _____



A)



B)



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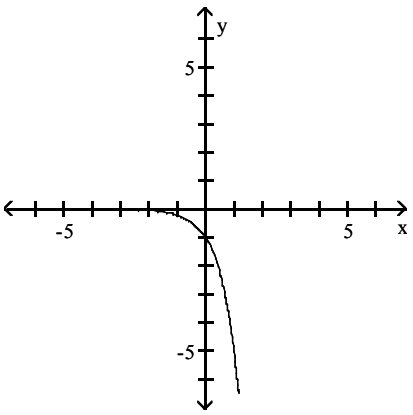

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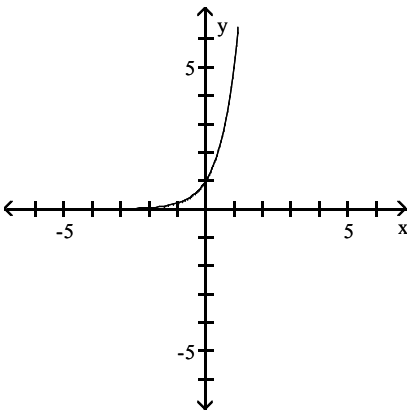


Objective: (5.2) Sketching the Graphs of Logarithmic Functions Using Transformations

Evaluate the expression without the use of a calculator, and then verify your answer using a calculator.

140) $e^{\ln 8}$ 140) _____

A) e^8 B) 7 C) 8 D) ln 8

Objective: (5.2) Understanding the Characteristics of Logarithmic Functions

Write the exponential equation as an equation involving a logarithm.

141) $7^3 = 343$ 141) _____

A) $\log_7 3 = 343$ B) $\log_7 343 = 3$ C) $\log_{343} 7 = 3$ D) $\log_3 343 = 7$

Objective: (5.2) Understanding the Definition of a Logarithmic Function

Write the logarithmic equation as an exponential equation.

142) $\log_2 x = 3$ 142) _____

A) $2^x = 3$ B) $3^2 = x$ C) $x^3 = 2$ D) $2^3 = x$

Objective: (5.2) Understanding the Definition of a Logarithmic Function

Use the properties of logarithms to evaluate the expression without the use of a calculator.

143) $4^{\log_4 6}$ 143) _____

A) 1 B) 6 C) 4 D) 24

Objective: (5.2) Understanding the Properties of Logarithms

Write the exponential equation as an equation involving a common logarithm or a natural logarithm.

144) $10^2 = 100$ 144) _____

A) $\log_2 100 = 10$ B) $\log 2 = 100$ C) $\log 100 = 2$ D) $\log_2 10 = 100$

Objective: (5.2) Using the Common and Natural Logarithms

Write the logarithmic equation as an exponential equation.

145) $\log(100) = 2$ 145) _____

A) $10^{20} = 100$ B) $10^{100} = 2$ C) $10^2 = 100$ D) $10^{1/2} = 100$

Objective: (5.2) Using the Common and Natural Logarithms

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

146) $\log_4 \sqrt{11x}$ 146) _____

A) $\frac{1}{2}\log_4 11x$ B) $\frac{1}{2}\log_4 11 + \frac{1}{2}\log_4 x$

C) $\log_4 11 + \frac{1}{2}\log_4 x$ D) $\log_4 \sqrt{11} + \log_4 \sqrt{x}$

Objective: (5.3) Expanding and Condensing Logarithmic Expressions

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.

147) $\log_5 250 - \log_5 2$ 147) _____

A) $\log_5 500$ B) $\log_5 248$ C) $\log_5 250^{1/2}$ D) 3

Objective: (5.3) Expanding and Condensing Logarithmic Expressions

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

148) $\log_b \frac{xy^3}{z^6}$ 148) _____

A) $\log_b x + 3\log_b y - 6\log_b z$ B) $\log_b x + 3\log_b y + 6\log_b z$

C) $\log_b x + \log_b y^3 + \log_b z^6$ D) $\log_b x + \log_b y^3 - \log_b z^6$

Objective: (5.3) Expanding and Condensing Logarithmic Expressions

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.

149) $5\ln(x - 11) - 8\ln x$ 149) _____

A) $\ln \frac{5(x - 11)}{8x}$ B) $\ln 40x(x - 11)$ C) $\ln x^8(x - 11)^5$ D) $\ln \frac{(x - 11)^5}{x^8}$

Objective: (5.3) Expanding and Condensing Logarithmic Expressions

Solve the equation.

150) $\log(2 + x) - \log(x - 5) = \log 2$ 150) _____

A) {-12} B) {12} C) $\left\{\frac{5}{2}\right\}$ D) $\varnothing$

Objective: (5.3) Solving Logarithmic Equations Using the Logarithm Property of Equality

Solve the logarithmic equation.

151) $\log_2 x = \log_{\sqrt{2}} 7$ 151) _____

A) $x = 49$ B) $x = \sqrt{7}$ C) $x = 2\sqrt{7}$ D) $x = 14$

Objective: (5.3) Using the Change of Base Formula

Use the change of base formula and a calculator to evaluate the logarithm. Round your answer to two decimal places.

152) $\log_{6.5} 4.2$ 152) _____

A) 0.65 B) 0.62 C) 1.30 D) 0.77

Objective: (5.3) Using the Change of Base Formula

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

153) $\log_2 \left(\frac{7}{13}\right)$ 153) _____

A) $\log_2 7 + \log_2 13$ B) $\log_2 13 - \log_2 7$

C) $\frac{\log_2 7}{\log_2 13}$ D) $\log_2 7 - \log_2 13$

Objective: (5.3) Using the Product Rule, Quotient Rule, and Power Rule for Logarithms

154) $\log_4 \left(\frac{16}{x}\right)$ 154) _____

A) $8 - \log_4 x$ B) $\frac{2}{x}$ C) $-2 \log_4 x$ D) $2 - \log_4 x$

Objective: (5.3) Using the Product Rule, Quotient Rule, and Power Rule for Logarithms

Solve the equation.

155) $3 \cdot 5^{2t-1} = 75$ 155) _____

A) $\left\{\frac{1}{2}\right\}$ B) {3} C) $\left\{\frac{13}{10}\right\}$ D) $\left\{\frac{3}{2}\right\}$

Objective: (5.4) Solving Exponential Equations

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

156) $e^{x+4} = 2$ 156) _____

A) {-3.31} B) {-3.08} C) {1.79} D) {-2.21}

Objective: (5.4) Solving Exponential Equations

Solve the equation.

157) $\log_{35} (x - 2) = 1 - \log_{35} x$ 157) _____

A) {-5} B) {-7} C) {5} D) {7}

Objective: (5.4) Solving Logarithmic Equations

158) $\log_3 x + \log_3 (x - 24) = 4$ 158) _____

A) {53} B) {27} C) {–3, 27} D) ∅

Objective: (5.4) Solving Logarithmic Equations

Solve the problem.

159) The half–life of silicon–32 is 710 years. If 60 grams is present now, how much will be present in 300 years? (Round your answer to three decimal places.) 159) _____

A) 44.767 B) 0 C) 58.268 D) 3.208

Objective: (5.5) Exponential Growth and Decay

160) Kimberly invested $3000 in her savings account for 7 years. When she withdrew it, she had $3779.58. Interest was compounded continuously. What was the interest rate on the account? Round to the nearest tenth of a percent. 160) _____

A) 3.45% B) 3.3% C) 3.4% D) 3.2%

Objective: (5.5) Solving Compound Interest Applications

161) The logistic growth function $f(t) = \frac{20{,}000}{1 + 399e^{-1.4t}}$ models the number of people who have become ill with a particular infection t weeks after its initial outbreak in a particular community. How many people were ill after 5 weeks? 161) _____

A) 14,664 people B) 20,000 people C) 20,400 people D) 250 people

Objective: (5.5) Solving Logistic Growth Applications

162) Sandy manages a ceramics shop and uses a 650°F kiln to fire ceramic greenware. After turning off her kiln, she must wait until its temperature gauge reaches 180°F before opening it and removing the ceramic pieces. If room temperature is 70°F and the gauge reads 550°F in 10 minutes, how long must she wait before opening the kiln? Round your answer to the nearest whole minute. 162) _____

A) 220 min B) 313 min C) 88 min D) 59 min

Objective: (5.5) Using Newton's Law of Cooling

Solve the system of linear equations using the elimination method.

163) 163) _____

$$\begin{aligned} 7x - 5y - z &= 27 \\ x - 8y + 9z &= 4 \\ 3x + y + z &= 33 \end{aligned}$$

A) (8, 5, 4) B) (16, 5, -8) C) (8, 4, 5) D) (-8, 5, 16)

Objective: (7.2) Solving a System of Linear Equations Using the Elimination Method

Solve the problem.

164) A deli sells three sizes of chicken sandwiches: the small chicken sandwich contains 4 ounces of meat and sells for $3.00; the regular chicken sandwich contains 8 ounces of meat and sells for $3.50; and the large chicken sandwich contains 10 ounces of meat and sells for $4.00. A customer requests a selection of each size for a reception. She and the manager agree on a combination of 52 sandwiches made from 22 pounds 4 ounces of chicken for a total cost of $178. How many of each size sandwich will be in this combination? (Note: 1 pound = 16 ounces) 164) _____

A) 24 small sandwiches, 10 medium sandwiches, 18 large sandwiches.
B) 18 small sandwiches, 12 medium sandwiches, 22 large sandwiches.
C) 22 small sandwiches, 16 medium sandwiches, 14 large sandwiches.
D) 20 small sandwiches, 22 medium sandwiches, 10 large sandwiches.

Objective: (7.2) Solving Applied Problems Using a System of Linear Equations Involving Three Variables

Solve the system of linear equations. If the system has infinitely many solutions, describe the solution with an ordered triple in terms of variable z.

165) $x + y + z = 7$
$x - y + 2z = 7$
$2x + 3z = 14$ 165) _____

A) $\left(-\frac{3z}{2} + 7, \frac{z}{2}, z\right)$ B) $\left(-\frac{3z}{2} + 7, 2z, z\right)$ C) $\left(-\frac{3z}{2} - 7, 2z, z\right)$ D) $\left(-\frac{3z}{2} - 7, \frac{z}{2}, z\right)$

Objective: (7.2) Solving Consistent, Dependent Systems of Linear Equations in Three Variables

166) $4x - y + 3z = 12$
$x + 4y + 6z = -32$
$5x + 3y + 9z = 20$ 166) _____

A) (–8, –7, 9) B) no solution C) (2, –7, –1) D) (8, –7, –2)

Objective: (7.2) Solving Inconsistent Systems of Linear Equations in Three Variables

Determine if the given ordered triple is a solution of the system.

167) (–5, -1, 4) 167) _____

$x + y + z = -2$
$x - y + 3z = 8$
$5x + y + z = -22$

A) solution B) not a solution

Objective: (7.2) Verifying the Solution of a System of Linear Equations in Three Variables

Determine whether the system corresponding to the given augmented matrix is dependent or inconsistent. If it is dependent, give the solution.

168) $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -8 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 0 & -9 \end{array}\right]$ 168) _____

A) dependent; (8, -4) B) inconsistent
C) dependent; (-8, 4) D) dependent; (-8, 4, -9)

Objective: (7.3) Determining Whether a System Has No Solution or Infinitely Many Solutions

Use Gaussian elimination to solve the linear system by finding an equivalent system in triangular form.

169) $5x + 4y + z = -16$
$5x - 2y - z = -2$
$4x + y + 3z = 7$ 169) _____

A) (-1, -4, 5) B) no solution C) (5, -4, -1) D) (-1, 5, -4)

Objective: (7.3) Solving a System of Linear Equations Using Gaussian Elimination

Solve the problem.

170) Ron attends a cocktail party (with his graphing calculator in his pocket). He wants to limit his food intake to 136 g protein, 125 g fat, and 174 g carbohydrate. According to the health conscious hostess, the marinated mushroom caps have 3 g protein, 5 g fat, and 9 g carbohydrate; the spicy meatballs have 14 g protein, 7 g fat, and 15 g carbohydrate; and the deviled eggs have 13 g protein, 15 g fat, and 6 g carbohydrate. How many of each snack can he eat to obtain his goal? 170) _____

A) 5 mushrooms, 3 meatballs, 9 eggs B) 10 mushrooms, 6 meatballs, 4 eggs
C) 3 mushrooms, 9 meatballs, 5 eggs D) 9 mushrooms, 5 meatballs, 3 eggs

Objective: (7.3) Solving Applied Problems Using a System of Linear Equations Involving Three Variables

Use Gauss–Jordan elimination to solve the linear system and determine whether the system has a unique solution, no solution, or infinitely many solutions. If the system has infinitely many solutions, describe the solution as an ordered triple involving variable z.

171) $\begin{aligned} x + 3y + 2z &= 11 \\ 4y + 9z &= -12 \\ x + 7y + 11z &= -1 \end{aligned}$ 171) _____

A) $\left(\frac{19z}{4} + 20, -\frac{9z}{4} + 3, z\right)$ B) $\left(-\frac{19z}{4} + 20, -\frac{9z}{4} + 3, z\right)$

C) $\left(\frac{19z}{4} + 20, \frac{9z}{4} + 3, z\right)$ D) $\left(\frac{19z}{4} + 20, -\frac{9z}{4} - 3, z\right)$

Objective: (7.3) Solving Consistent, Dependent Systems of Linear Equations in Three Variables

172) $\begin{aligned} 5x + 2y + z &= -11 \\ 2x - 3y - z &= 17 \\ 7x - y &= 12 \end{aligned}$ 172) _____

A) (0, –6, 1) B) (1, –5, 0) C) (–2, 0, –1) D) no solution

Objective: (7.3) Solving Inconsistent Systems of Linear Equations in Three Variables

Use Gauss–Jordan elimination to solve the linear system and determine whether the system has a unique solution, no solution, or infinitely many solutions. If the system has infinitely many solutions, describe the solution as an ordered triple involving variable z.

173) $\begin{aligned} x + y + z &= 7 \\ x - y + 2z &= 7 \end{aligned}$ 173) _____

A) (–3z + 14, 2z – 7, z) B) $\left(-\frac{3}{2}z + 7, \frac{1}{2}z, z\right)$

C) (4, 1, 2) D) (8, –3, 2)

Objective: (7.3) Solving Linear Systems Having Fewer Equations Than Variables

Use Gaussian elimination and matrices to solve the system of linear equations. Write your final augmented matrix in triangular form and then solve for each variable using back substitution.

174) $\begin{aligned} x - y + 4z &= 16 \\ 4x + z &= 5 \\ x + 5y + z &= 25 \end{aligned}$ 174) _____

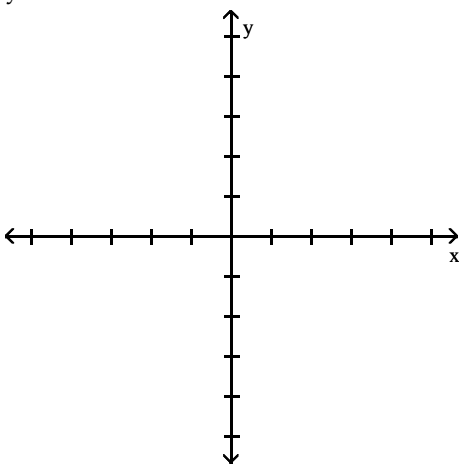
A) (0, 4, 5) B) (5, 0, 4) C) (5, 4, 0) D) (0, 5, 4)

Objective: (7.3) Using an Augmented Matrix to Solve a System of Linear Equations

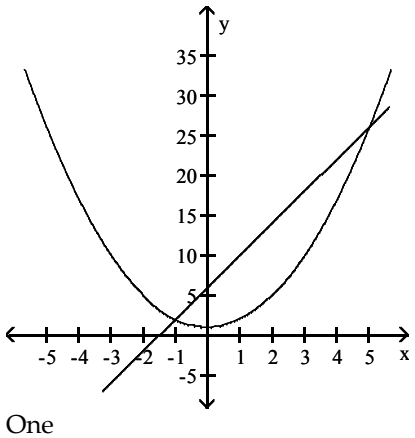
A system of nonlinear equations is given. Sketch the graph of the equation of the system and then determine the number of real solutions to the system. Do not solve the system.

175) $x^2 = y - 1$
$y = -4x + 6$

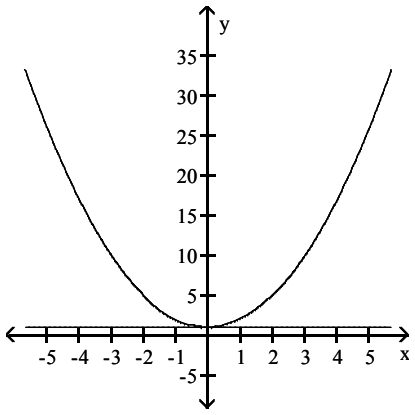
175) _____



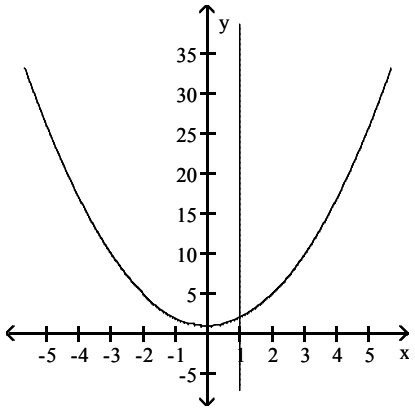
A) Two



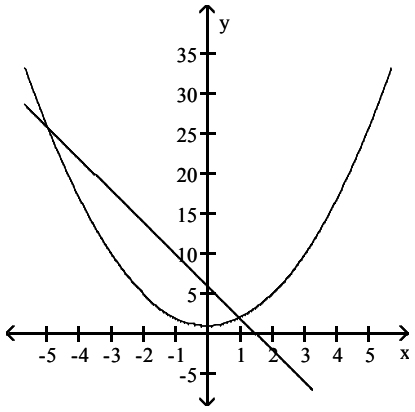
B) One



C) One



D) Two



Objective: (7.5) Determining the Number of Solutions to a System of Nonlinear Equations

Determine the real solutions to the system of nonlinear equations.

176) $2x^2 + y^2 = 17$
$3x^2 - 2y^2 = -6$

176) _____

A) (2, –3), (–2, 3)
B) (1, 3), (–1, –3)
C) (2, 3), (2, –3), (–2, 3), (–2, –3)
D) (1, 3), (1, –3), (–1, 3), (–1, –3)

Objective: (7.5) Solving a System of Nonlinear Equations Using Substitution, Elimination, or Graphing

177) $x^2 + y^2 = 50$ 177) _____

$(x - 2)^2 + y^2 = 50$

A) (1, 7), (1, –7) B) (7, 1), (7, –1)

C) (1, 7), (1, –7), (–1, 7), (–1, –7) D) (7, 1), (7, –1), (–7, 1), (–7, –1)

Objective: (7.5) Solving a System of Nonlinear Equations Using Substitution, Elimination, or Graphing

178) $x^2 - 3y^2 - 1 = 0$ 178) _____

$4x^2 + 3y^2 - 19 = 0$

A) (2, 1), (–2, –1) B) (2, 1), (2, –1), (–2, 1), (–2, –1)

C) (–1, 2), (1, –2) D) (1, 2), (–1, 2), (1, –2), (–1, –2)

Objective: (7.5) Solving a System of Nonlinear Equations Using Substitution, Elimination, or Graphing

179) $y = x^2 + 4$ 179) _____

$y = -x^2 + 12$

A) (2, 8), (–2, 8) B) (2, 8), (2, –8)

C) (2, 8), (2, –8), (–2, 8), (–2, –8) D) (8, 2), (8, –2)

Objective: (7.5) Solving a System of Nonlinear Equations Using Substitution, Elimination, or Graphing

180) $x^2 + y^2 = 4$ 180) _____

$x + y = 2$

A) (0, –2), (–2, 0) B) (2,–2), (–2, –2) C) (0, 2), (2, 0) D) (0, 0), (2, –2)

Objective: (7.5) Solving a System of Nonlinear Equations Using the Substitution Method

181) $x + y = 2$ 181) _____

$x^2 + y^2 = -6y + 8$

A) (-2, 4), (1, 1) B) (4, -2), (1, 1) C) (2, 0), (–1, 3) D) (0, 2), (3, –1)

Objective: (7.5) Solving a System of Nonlinear Equations Using the Substitution Method

182) $xy = 1$ 182) _____

$7x - y = -6$

A) $\left(\frac{1}{7}, 7\right), (-1, -1)$ B) $(-1, -1)$ C) $\left(7, \frac{1}{7}\right), (-1, -1)$ D) (–7, 7), (1, –1)

Objective: (7.5) Solving a System of Nonlinear Equations Using the Substitution Method

183) $xy = 16$ 183) _____

$x^2 + y^2 = 68$

A) (-2, -8), (-8, -2), (-2, 8), (-8, 2) B) (2, 8), (8, 2), (2, -8), (8, -2)

C) (2, -2), (-2, -8), (8, 2), (-8, -2) D) (2, 8), (-2, -8), (2, -8), (-2, 8)

Objective: (7.5) Solving a System of Nonlinear Equations Using the Substitution Method

Solve the problem.

184) The diagonal of the floor of a rectangular office cubicle is 2 feet longer than the length of the cubicle and 5 feet longer than twice the width. Find the dimensions of the cubicle. Round to the nearest tenth, if necessary. 184) _____

A) width: 9.7 feet, length: 22.4 feet B) width: 3.9 feet, length: 9.7 feet

C) width: 2 feet, length: 9 feet D) width: 4 feet, length: 11 feet

Objective: (7.5) Solving Applied Problems Using a System of Nonlinear Equations

Let x represent one number and let y represent the other number. Use the given conditions to write a system of nonlinear equations. Solve the system and find the numbers.

185) The sum of the squares of two numbers is 13. The sum of the two numbers is 5. Find the two numbers. 185) _____

A) -3 and -2
B) 2 and 3
C) -3 and 2; -2 and 3
D) 2 and 3; -3 and -2

Objective: (7.5) Solving Applied Problems Using a System of Nonlinear Equations

Determine if each ordered pair is a solution to the given system of inequalities in two variables.

186) $3x - y = -17$ 186) _____

$y = x^2 + 7$

(i) (5, 32); (ii) (-2, 11)

A) (i) No; (ii) Yes
B) (i) No; (ii) No
C) (i) Yes; (ii) Yes
D) (i) Yes; (ii) No

Objective: (7.6) Determining If an Ordered Pair Is a Solution to a System of Linear Inequalities in Two Variables

187) $xy = 54$ 187) _____

$x^2 + y^2 = 117$

(i) (6, -9); (ii) (-9, -6)

A) (i) Yes; (ii) Yes
B) (i) No; (ii) No
C) (i) No; (ii) Yes
D) (i) Yes; (ii) No

Objective: (7.6) Determining If an Ordered Pair Is a Solution to a System of Linear Inequalities in Two Variables

Determine if the ordered pair is a solution to the given inequality.

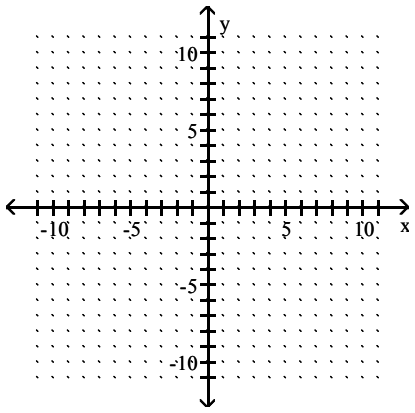
188) $3x^2 - y \leq 9$; (−0.5, 5.5) 188) _____

A) Yes
B) No

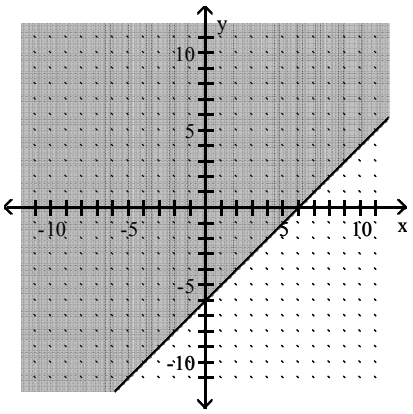
Objective: (7.6) Determining If an Ordered Pair Is a Solution to an Inequality in Two Variables

Graph the inequality.

189) $y + 6 < x$ 189) _____



A)



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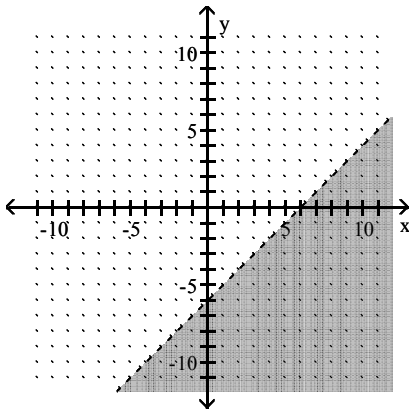

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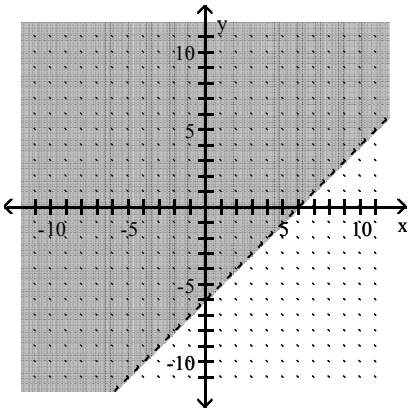
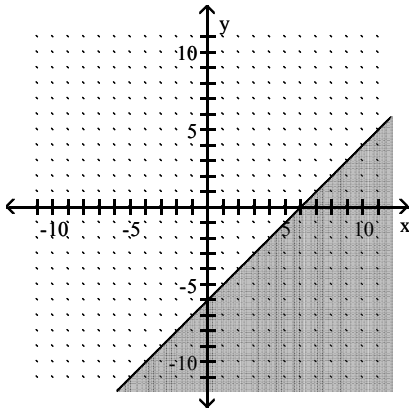
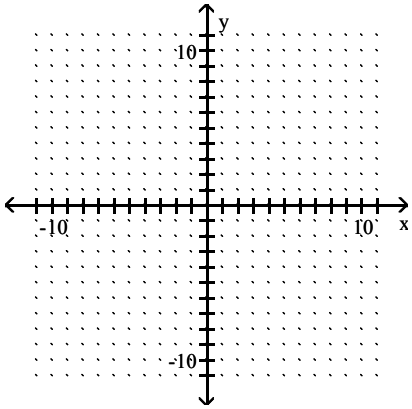


D)

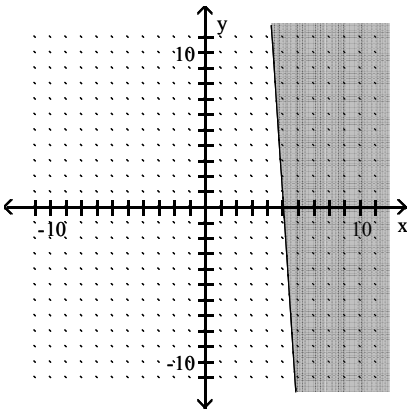


Objective: (7.6) Graphing a Linear Inequality in Two Variables

190) $3x + 5y \leq 15$ 190) _____



A)



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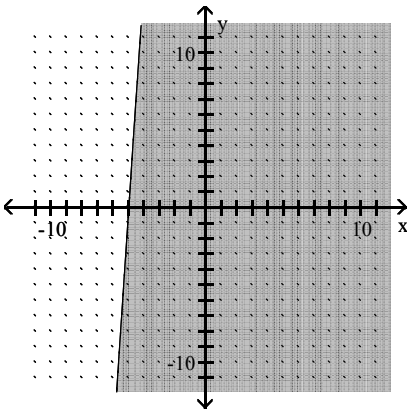

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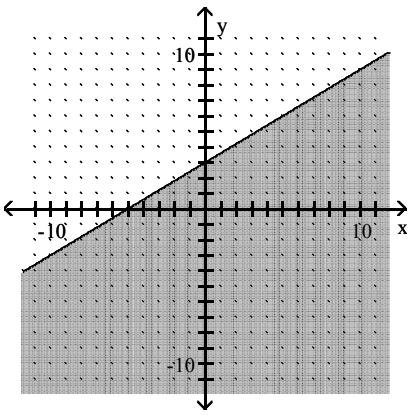

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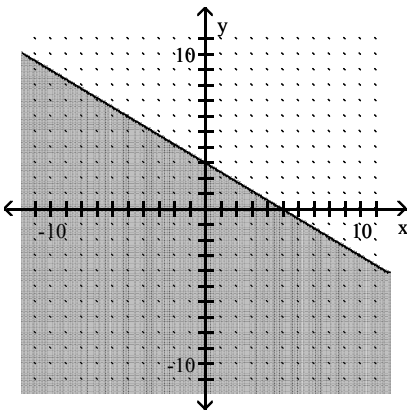
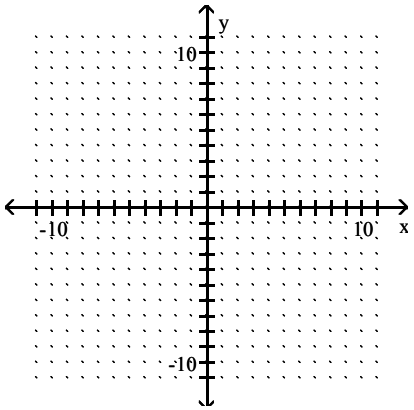
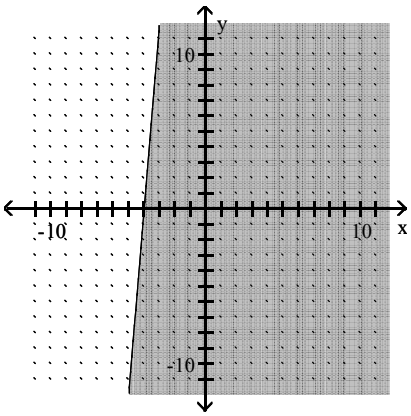


Objective: (7.6) Graphing a Linear Inequality in Two Variables

191) $\frac{x}{4} + \frac{y}{3} \leq 1$ 191) _____



A)



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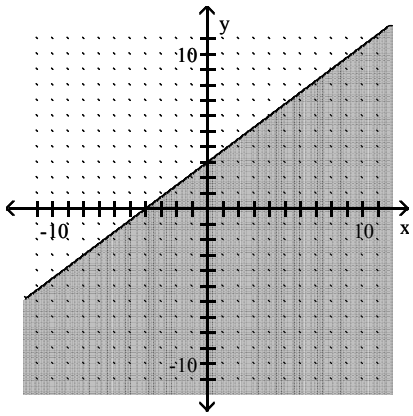

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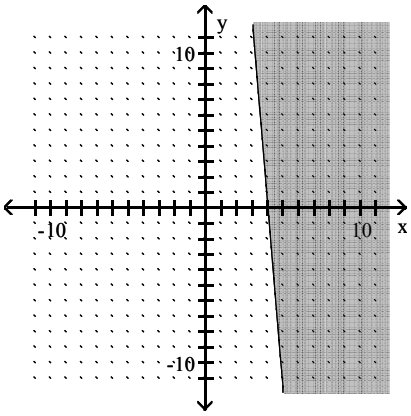

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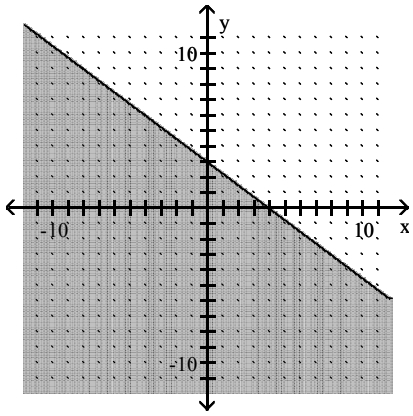
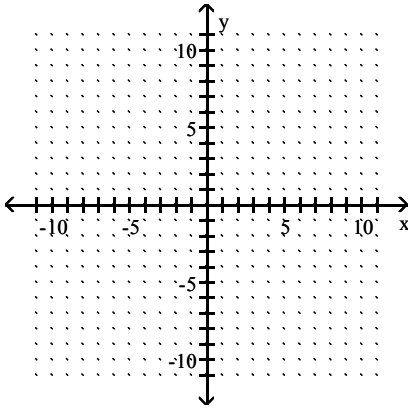
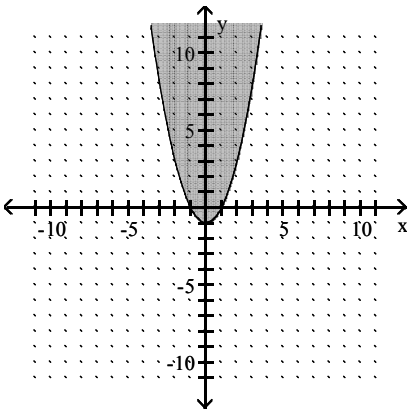


Objective: (7.6) Graphing a Linear Inequality in Two Variables

192) $y \leq x^2 + 1$ 192) _____



A)



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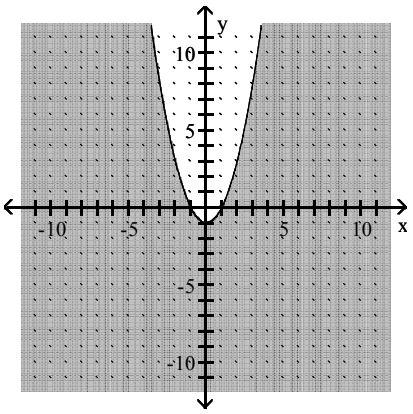

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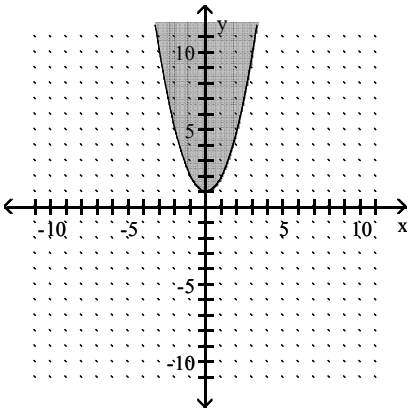

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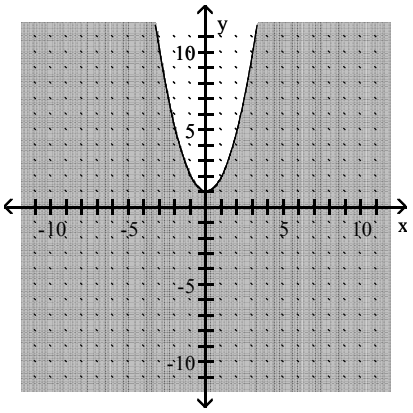
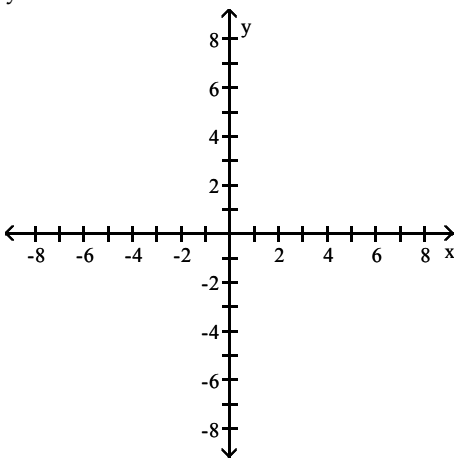


Objective: (7.6) Graphing a Nonlinear Inequality in Two Variables

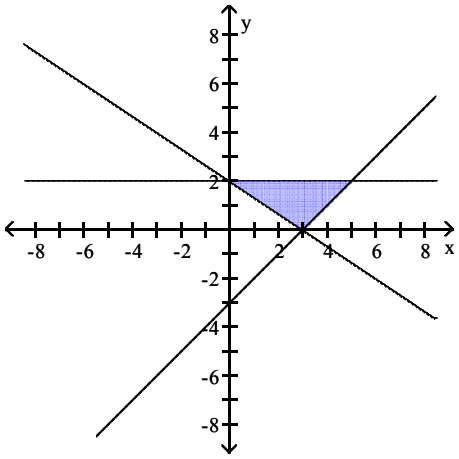
Graph the system of inequalities.

193) $2x + 3y \geq 6$
$x - y \leq 3$
$y \leq 2$

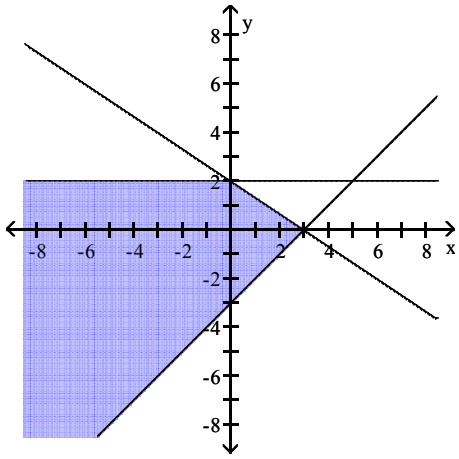
193) _____



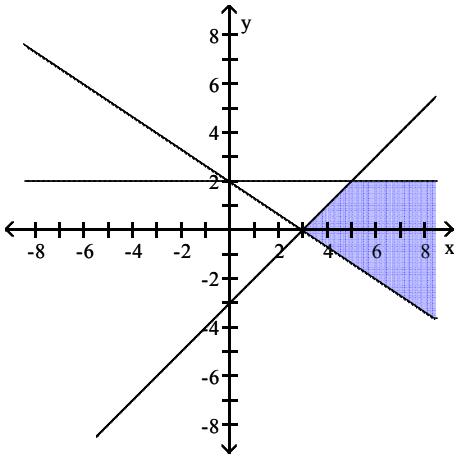
A)



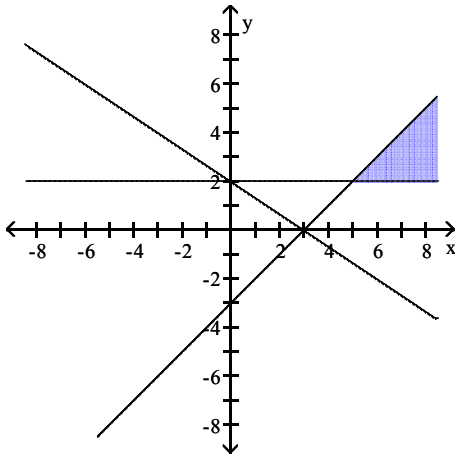
B)



C)



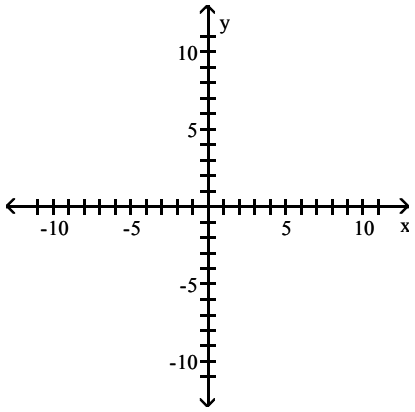
D)



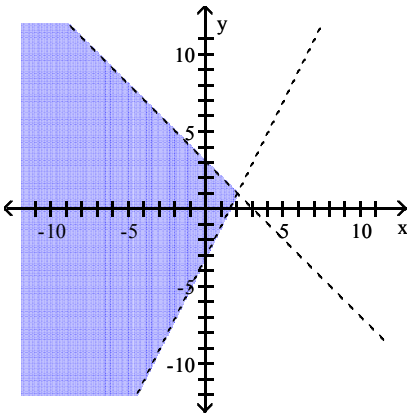
Objective: (7.6) Graphing a System of Linear Inequalities in Two Variables

194) $y < -x + 3$
$y > 2x - 3$

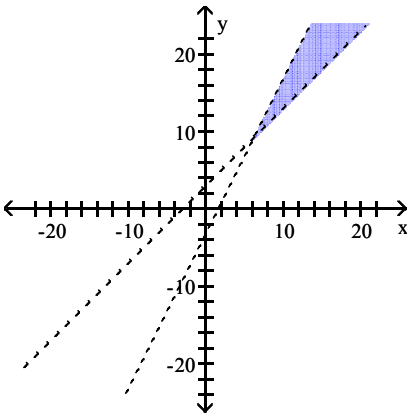
194) _____



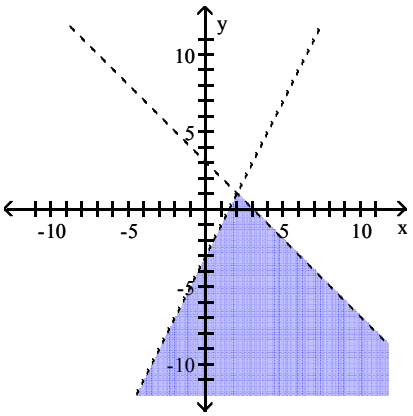
A)



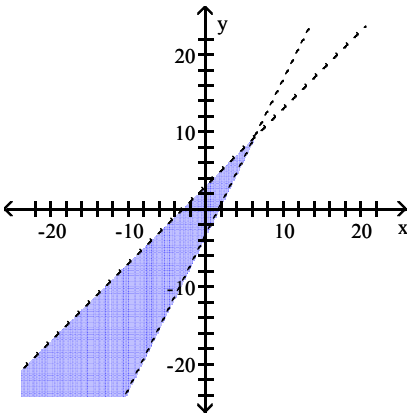
B)



C)



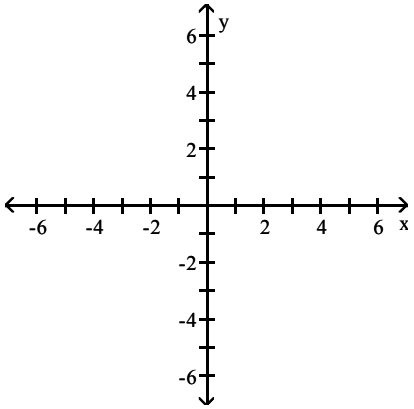
D)



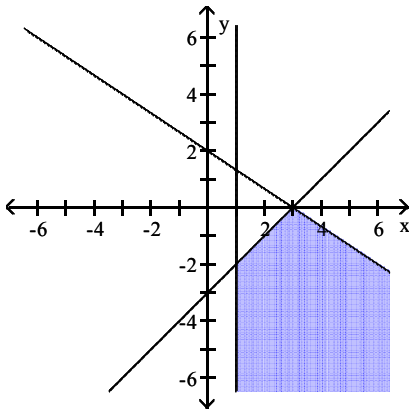
Objective: (7.6) Graphing a System of Linear Inequalities in Two Variables

195) $2x + 3y \geq 6$
$x - y \leq 3$
$x \geq 1$

195) _____



A)



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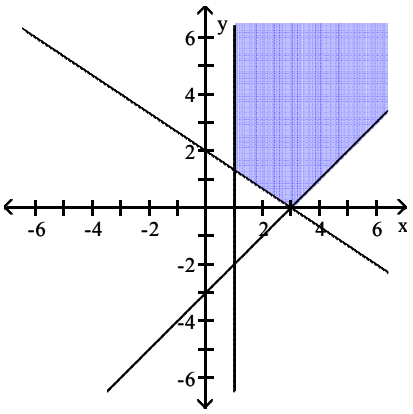

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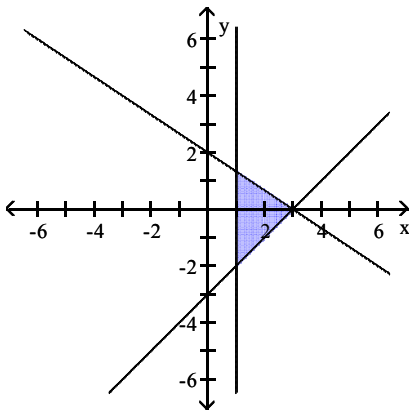
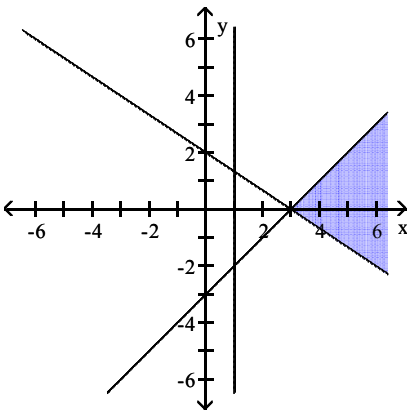


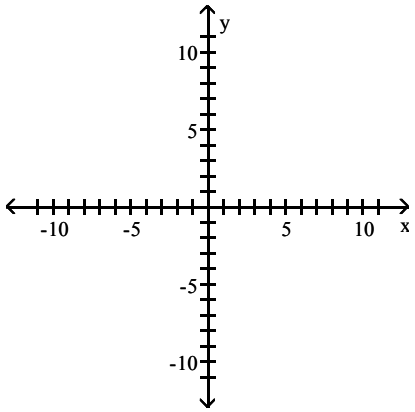
D)



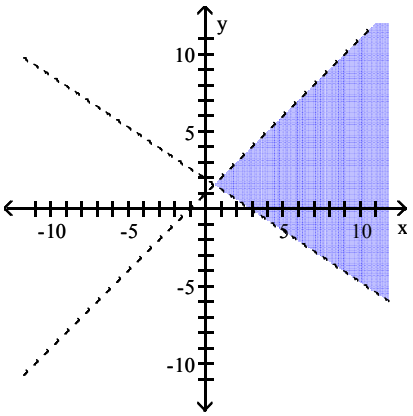
Objective: (7.6) Graphing a System of Linear Inequalities in Two Variables

196) $y < x + 1$
$2x + 3y > 6$

196) _____



A)



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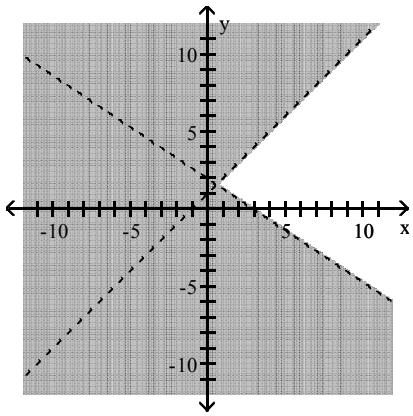

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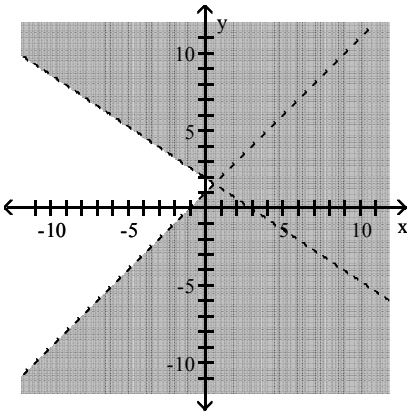
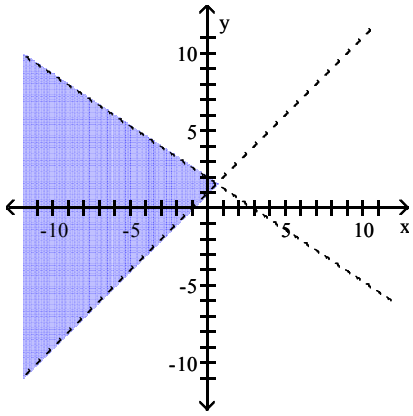


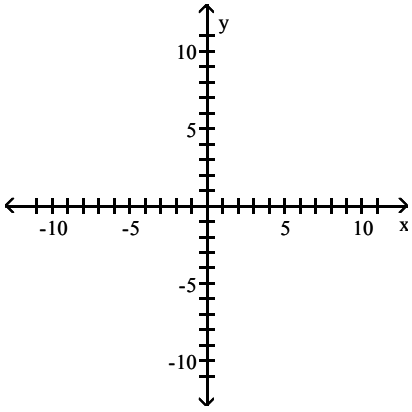
D)



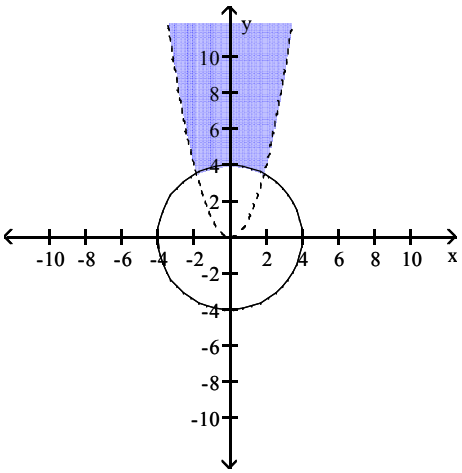
Objective: (7.6) Graphing a System of Linear Inequalities in Two Variables

197) $x^2 + y^2 \leq 16$
$y - x^2 > 0$

197) _____



A)



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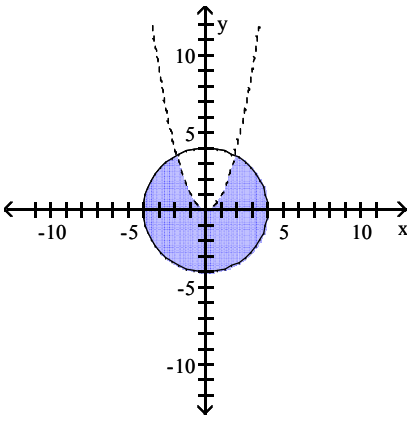

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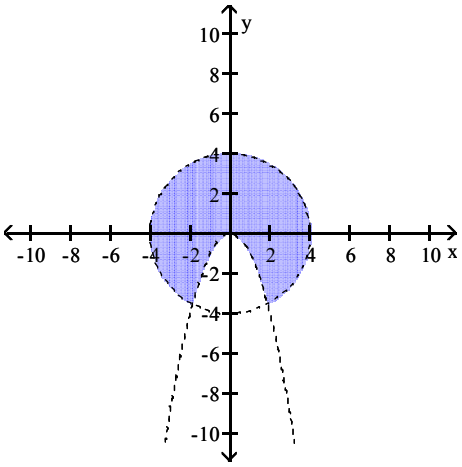

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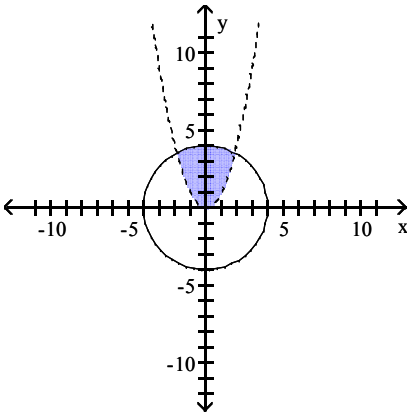
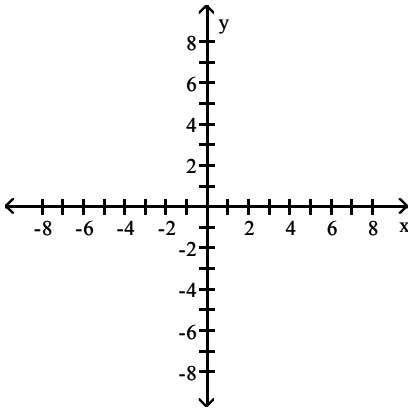


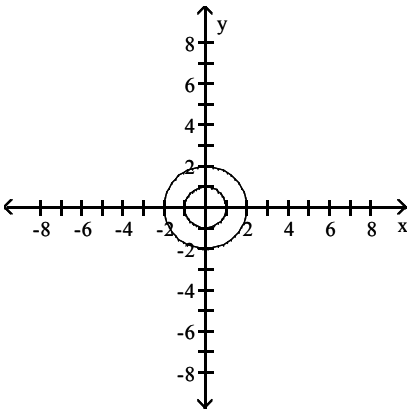
Objective: (7.6) Graphing a System of Nonlinear Inequalities in Two Variables

198) $x^2 + y^2 \leq 4$
$x^2 + y^2 \geq 1$

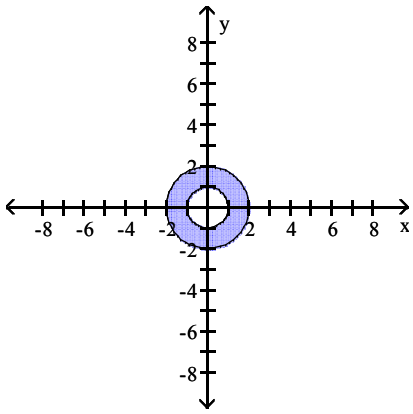
198) _____



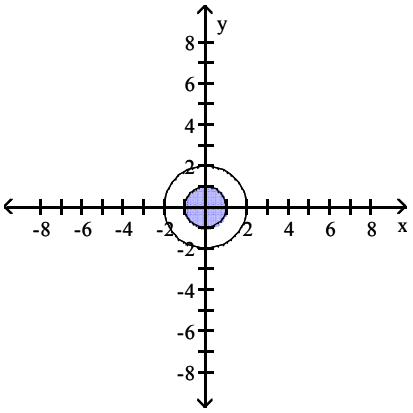
A) no solution



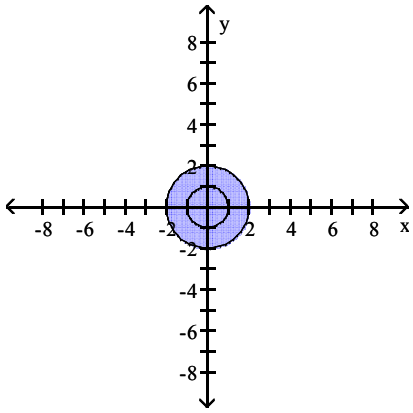
B)



C)



D)



Objective: (7.6) Graphing a System of Nonlinear Inequalities in Two Variables