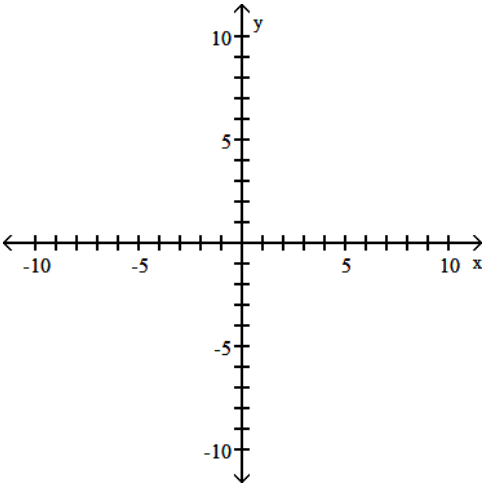
Exam

Name_____

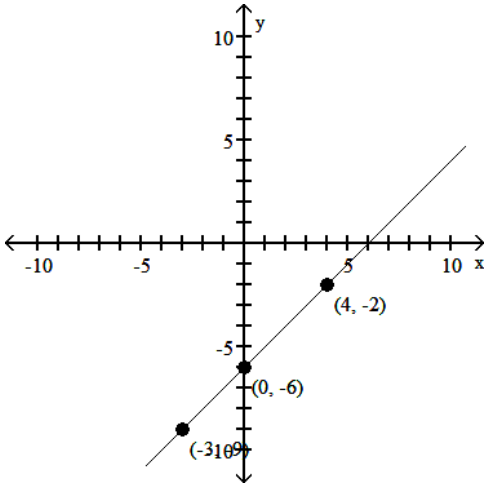
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use point-by-point plotting to sketch the graph of the equation.

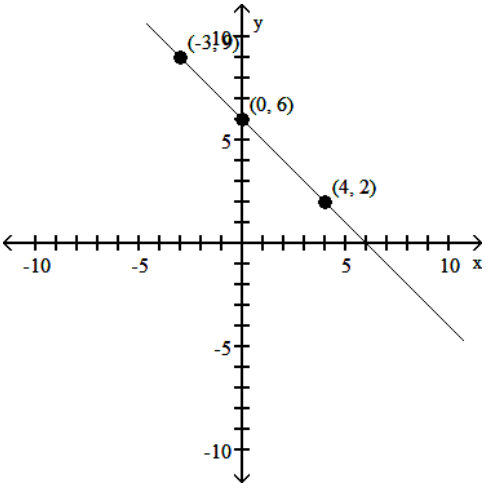
1) y = x - 6 1) _____



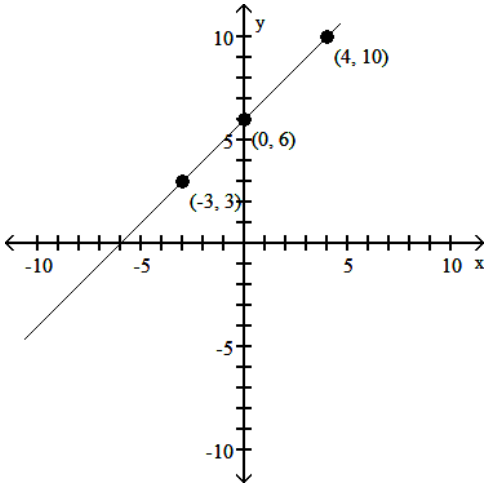
A)



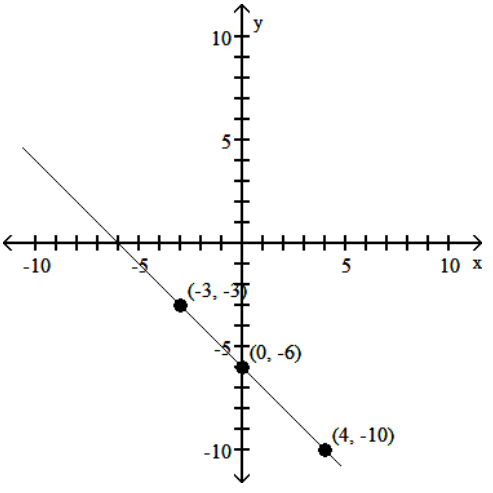
B)



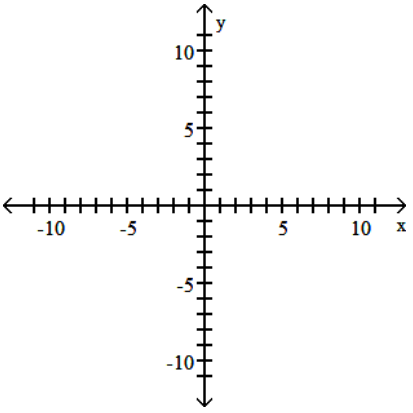
C)



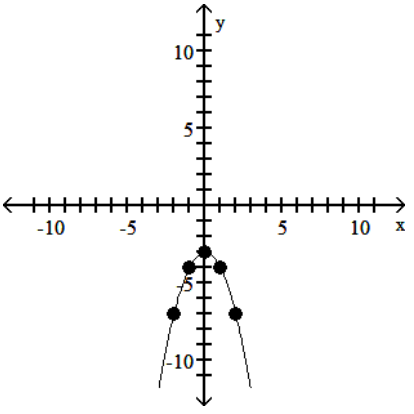
D)



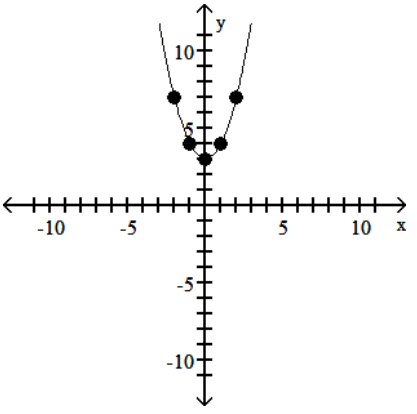
2) $y = x^2 - 3$ 2) _____


y
10
5
-10
-5
5
10
x
-5
-10

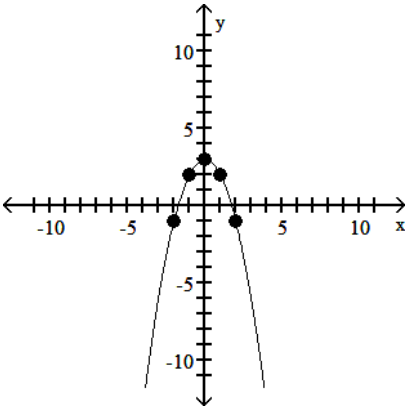
A)


y
10
5
-10
-5
5
10
x
-5
-10

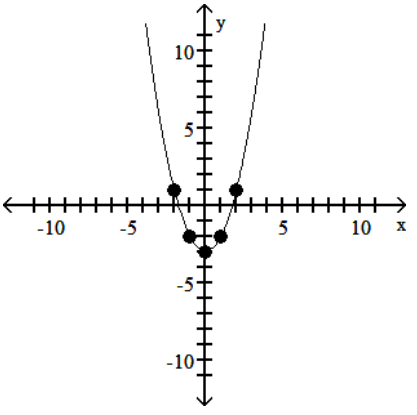
B)


y
10
5
-10
-5
5
10
x
-5
-10

C)

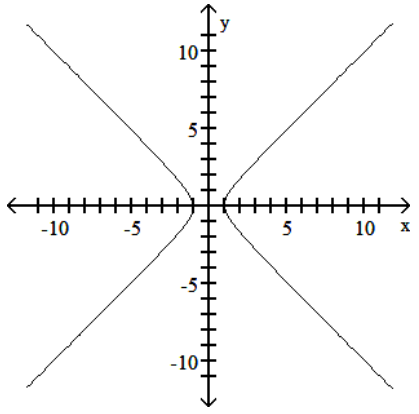

y
10
5
-10
-5
5
10
x
-5
-10

D)


y
10
5
-10
-5
5
10
x
-5
-10

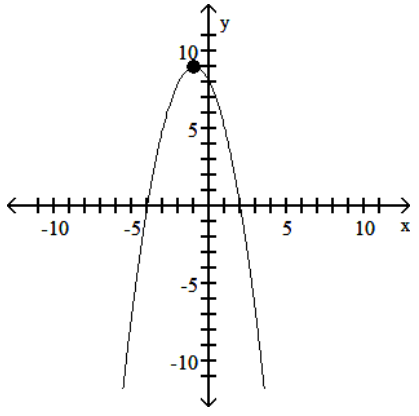
Determine whether the graph is the graph of a function.

3) 3) _____



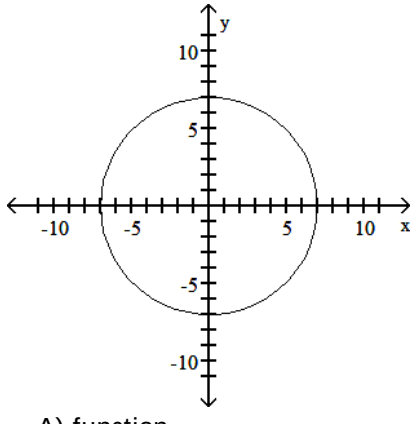
A) function B) not a function

4) 4) _____



A) function B) not a function

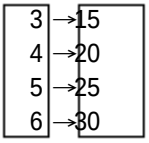
5) 5) _____



A) function B) not a function

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

6) 6) _____

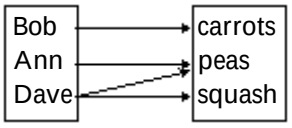


A) function
domain: {3, 4, 5, 6}
range: {15, 20, 25, 30}

B) function
domain:{15, 20, 25, 30}
range: {3, 4, 5, 6}

C) not a function

7) 7) _____



A) function
domain: {carrots, peas, squash}
range: {Bob, Ann, Dave}

B) function
domain: {Bob, Ann, Dave}
range: {carrots, peas, squash}

C) not a function

8) {(19, -2), (3, -1), (3, 0), (4, 1), (12, 3)} 8) _____

A) function
domain: {-2, -1, 0, 1, 3}
range: {19, 4, 3, 12}

B) function
domain: {19, 4, 3, 12}
range: {-2, -1, 0, 1, 3}

C) not a function

9) {(-2, 8), (-1, 5), (0, 4), (1, 5), (3, 13)} 9) _____

A) function
domain: {8, 5, 4, 13}
range: {-2, -1, 0, 1, 3}

B) function
domain: {-2, -1, 0, 1, 3}
range: {8, 5, 4, 13}

C) not a function

Determine whether the function is linear, constant, or neither

10) $y = \frac{x + 3}{7}$ 10) _____

A) Linear B) Constant C) Neither

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

A) Linear B) Constant C) Neither

12) $y = \frac{2\pi}{3}$ 12) _____

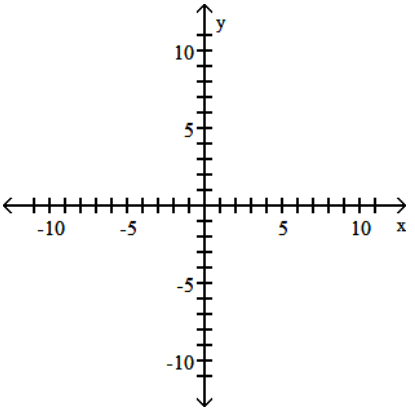
A) Linear B) Constant C) Neither

13) $y - 12 = 0$ 13) _____

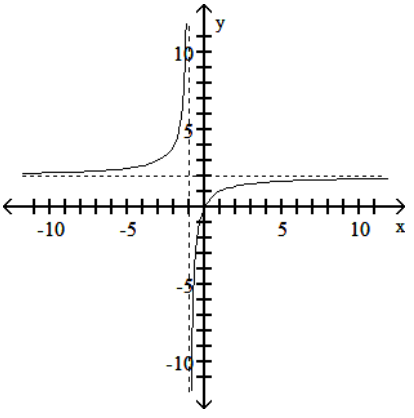
A) Linear B) Constant C) Neither

Use point-by-point plotting to sketch the graph of the equation.

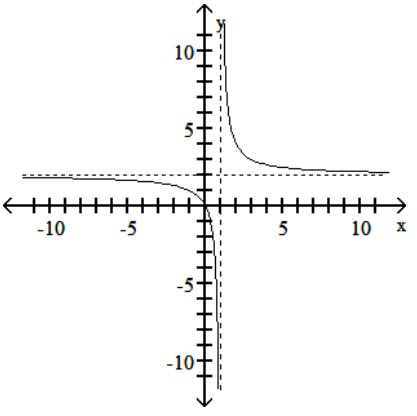
14) $f(x) = \frac{2x}{x - 1}$ 14) _____



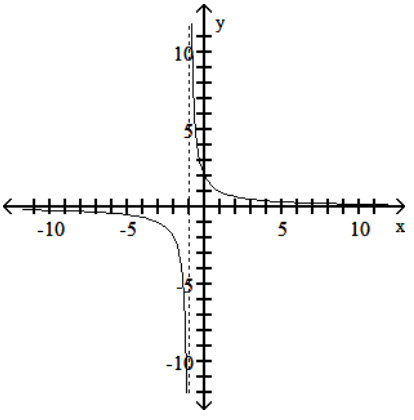
A)



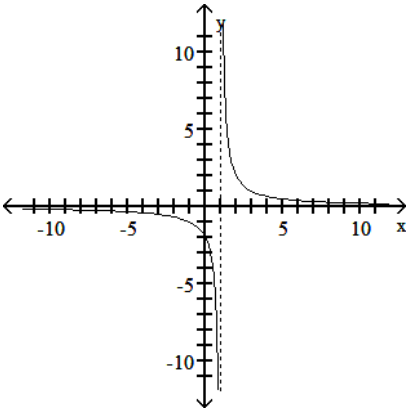
B)



C)

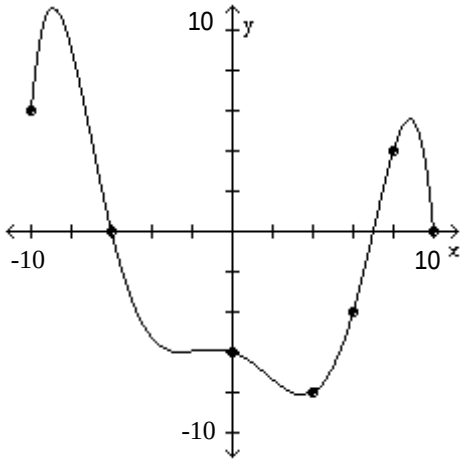


D)



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

15) Use the graph of f given below to find f(8). 15) _____



A) 10 B) 14 C) 4 D) 8

Find the function value.

16) Find f(-7) when $f(x) = 4 - 6x^2$. 16) _____

A) -290 B) 46 C) 88 D) 298

17) $f(x) = \frac{x^2 + 7}{x^3 + 6x}$; f(4) 17) _____

A) $\frac{23}{70}$ B) $\frac{2}{11}$ C) $\frac{23}{88}$ D) $\frac{23}{64}$

18) Given that $f(x) = 5x^2 - 2x$, find f(t + 2). 18) _____

A) 3t + 6 B) $5t^2 - 18t + 16$ C) $5t^2 + 18t + 16$ D) $t^2 + 2t - 6$

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

Provide an appropriate response.

19) If $g(x) = -4x^2 + x - 9$, find g(-2), g(1), and $g\left(\frac{3}{2}\right)$. 19) _____

20) For f(t) = 3t + 2 and $g(t) = 2 - t^2$, find 4f(3) - g(-3) + g(0). 20) _____

21) For f(t) = 3 - 5t, find $\frac{f(a + h) - f(a)}{h}$. 21) _____

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

Compute and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$.

22) $f(x) = 5x^2 + 7x$ 22) _____

A) $10x + 7$ B) $10x^2 + 5h + 7x$ C) $15x - 7h + 14$ D) $10x + 5h + 7$

Determine the domain of the function.

23) $f(x) = -7x + 9$ 23) _____

A) $x \leq \frac{9}{7}$ B) No solution

C) All real numbers except $\frac{9}{7}$ D) All real numbers

24) $f(x) = \frac{x}{x - 2}$ 24) _____

A) No solution B) All real numbers except 2

C) All real numbers D) $x < 2$

25) $f(x) = \sqrt{3 - x}$ 25) _____

A) No solution B) $x \leq 3$

C) All real numbers except 3 D) $x < 3$

26) $f(x) = \frac{8}{x^3}$ 26) _____

A) All real numbers except 0 B) All real numbers

C) $x < 0$ D) No solution

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

Provide an appropriate response.

27) Only one of the following functions has domain which is not equal to all real numbers. State which function and state its domain. 27) _____

(A) $h(x) = 4x^2 - 3x - 5$ (B) $f(x) = \frac{2x}{48 - x}$ (C) $g(x) = \frac{x + 7}{2}$

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

Determine if the equation specifies a function with independent variable x. If so, find the domain. If not, find a value of x to which there corresponds more than one value of y.

28) $x - y^2 = 9$ 28) _____

A) A function with domain $\mathbb{R}$

B) Not a function; for example, when $x = 10$, $y = \pm 1$

29) $y = x^2 + 5$ 29) _____

A) A function with domain $\mathbb{R}$

B) Not a function; for example, when $x = 5$, then $y = \pm 1$

30) $xy = 7$ 30) _____

A) A function with domain all real numbers except x = 0

B) Not a function; for example, when $x = 7$, $y = \pm 1$

31) $xy + 3y = -4$ 31) _____

A) A function with domain all real numbers except x = -3

B) Not a function; for example, when x = -4, $y = \pm 3$

32) $x^2 + y^2 = 16$ 32) _____

A) A function with domain $\mathbb{R}$

B) Not a function; for example, when x = 0, $y = \pm 4$

33) $x^2 - y^2 = 9$ 33) _____

A) A function with domain all real numbers except x = 5

B) Not a function; for example, when x = 5, $y = \pm 4$

Solve the problem.

34) The function F described by F(x) = 2.75x + 71.48 can be used to estimate the height, in centimeters, of a woman whose humerus (the bone from the elbow to the shoulder) is x cm long. Estimate the height of a woman whose humerus is 30.93 cm long. Round your answer to the nearest four decimal places. 34) _____

A) 13.5775 cm B) 156.5375 cm C) 105.1600 cm D) 43.3000 cm

35) The function M described by M(x) = 2.89x + 70.64 can be used to estimate the height, in centimeters, of a male whose humerus (the bone from the elbow to the shoulder) is x cm long. Estimate the height of a male whose humerus is 30.93 cm long. Round your answer to the nearest four decimal places. 35) _____

A) 156.5375 cm B) 30.9300 cm C) 160.0277 cm D) 157.3400 m

36) To estimate the ideal minimum weight of a woman in pounds multiply her height in inches by 4 and subtract 130. Let W = the ideal minimum weight and h = height. W is a linear function of h. Find the ideal minimum weight of a woman whose height is 62 inches. 36) _____

A) 120 lb B) 118 lb C) 378 lb D) 130 lb

37) The point at which a company's costs equals its revenue is the break-even. C represents cost, in dollars, of x units of a product. R represents the revenue, in dollars, for the sale of x units. Find the number of units that must be produced and sold in order to break even. 37) _____

C = 15x + 12,000

R = 18x - 6000

A) 545 B) 12,000 C) 800 D) 6000

38) The function P, given by $P(d) = \frac{1}{33}d + 1$, gives the pressure, in atmospheres (atm), at a depth d, in feet, under the sea. Find the pressure at 200 feet. Round your answer to the nearest whole number. 38) _____

A) 7 atm B) 201 atm C) 200 atm D) 8 atm

39) To estimate the ideal minimum weight of a woman in pounds multiply her height in inches by 4 and subtract 130. Let W = the ideal minimum weight and h = height. Express W as a linear function of h. 39) _____

A) W(h) = 130h + 4
B) W(h) = 4 (h + 130)
C) W(h) = 4h - 130
D) W(h) = 130

Provide an appropriate response.

40) In a profit-loss analysis, point where revenue equals cost. 40) _____

A) inflection point
B) profit-loss point
C) break-even point
D) turning point

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

41) Let T be the set of teachers at a high school and let S be the set of students enrolled at that school. Determine which of the following correspondences define a function. Explain. 41) _____
(A) A student corresponds to the teacher if the student is enrolled in the teacher's class.
(B) A student corresponds to every teacher of the school.

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

Give the domain and range of the function.

42) $f(x) = x^2 + 4$ 42) _____

A) Domain: [4, ∞); Range: all real numbers
B) Domain: all real numbers; Range: [-4, ∞)
C) Domain: [0, ∞); Range: [0, ∞)
D) Domain: all real numbers; Range: [4, ∞)

43) $g(x) = x^2 - 2$ 43) _____

A) Domain: [2, ∞); Range: all real numbers
B) Domain: all real numbers; Range: [-3, ∞)
C) Domain: all real numbers; Range: [-2, ∞)
D) Domain: [0, ∞); Range: [0, ∞)

44) $h(x) = -4|x|$ 44) _____

A) Domain: (-∞, 0]; Range: all real numbers
B) Domain: all real numbers; Range: (-∞, 0]
C) Domain: all real numbers; Range: (-∞, 3]
D) Domain: [0, ∞); Range: [0, ∞)

45) $s(x) = \sqrt{3 - x}$ 45) _____

A) Domain: all real numbers; Range: [0, ∞)
B) Domain: $(\sqrt{3}, \infty)$; Range: (-∞, 0]
C) Domain: (-∞, 3) ∪ (3, ∞); Range: (-∞, 0) ∪ (0, ∞)
D) Domain: (-∞, 3]; Range: [0, ∞)

46) $r(x) = |x - 7| - 2$ 46) _____

A) Domain: all real numbers; Range: all real numbers
B) Domain: all real numbers; Range: [-2, ∞)
C) Domain: all real numbers; Range: [0, ∞)
D) Domain: [-2, ∞); Range: all real numbers

Provide an appropriate response.

47) How can the graph of $f(x) = -\sqrt{x + 1}$ be obtained from the graph of $y = \sqrt{x}$? 47) _____

A) Shift it horizontally 1 units to the right. Reflect it across the x-axis.
B) Shift it horizontally -1 units to the left. Reflect it across the x-axis.
C) Shift it horizontally 1 units to the left. Reflect it across the x-axis.
D) Shift it horizontally 1 units to the left. Reflect it across the y-axis.

48) How can the graph of $f(x) = -(x - 1)^2$ 6 be obtained from the graph of $y = x^2$? 48) _____

A) Shift it horizontally 1 units to the right. Reflect it across the y-axis. Shift it 6 units up.
B) Shift it horizontally 1 units to the left. Reflect it across the x-axis. Shift it 6 units up.
C) Shift it horizontally 1 units to the right. Reflect it across the y-axis. Shift it 6 units down.
D) Shift it horizontally 1 units to the right. Reflect it across the x-axis. Shift it 6 units up.

Write an equation for a function that has a graph with the given transformations.

49) The shape of $y = \sqrt{x}$ is shifted 5 units to the left. Then the graph is shifted 7 units upward. 49) _____

A) $f(x) = \sqrt{x + 7} + 5$
B) $f(x) = 7\sqrt{x + 5}$
C) $f(x) = \sqrt{x + 5} + 7$
D) $f(x) = \sqrt{x - 5} + 7$

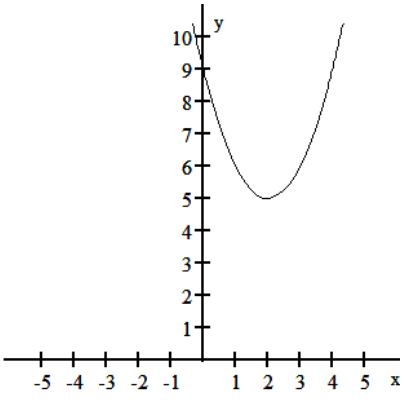
50) The shape of $y = x^2$ is vertically stretched by a factor of 10, and the resulting graph is reflected across the x-axis. 50) _____

A) $f(x) = 10x^2$
B) $f(x) = (x - 10)^2$
C) $f(x) = 10(x - 10)^2$
D) $f(x) = -10x^2$

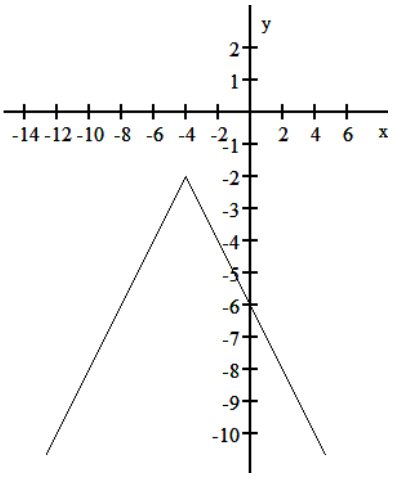
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

51) The following graph represents the result of applying a sequence of transformations to the graph of a basic function. Identify the basic function and describe the transformation(s). Write the equation for the given graph. 51) _____



52) The following graph represents the result of applying a sequence of transformations to the graph of a basic function. Identify the basic function and describe the transformation(s). Write the equation for the given graph. 52) _____

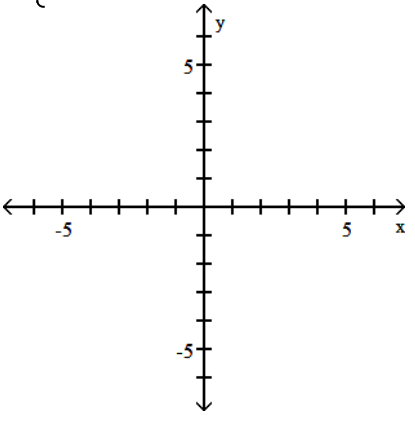


MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

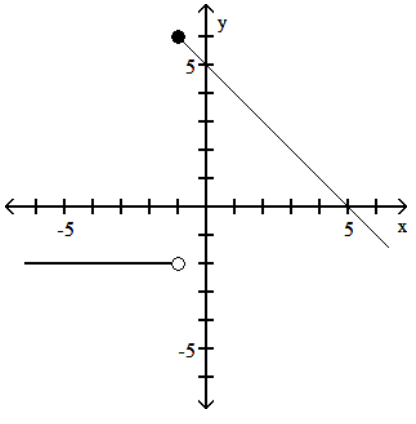
Graph the function.

53) 53) _____

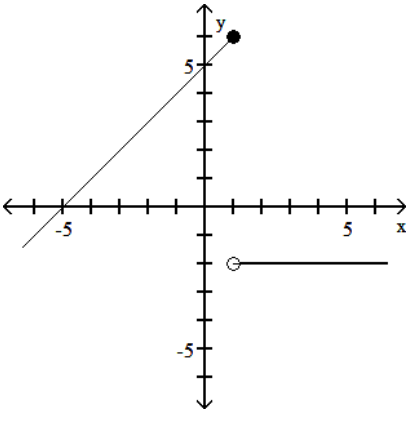
$$f(x) = \begin{cases} x + 5 & \text{if } x < 1 \\ -2 & \text{if } x \geq 1 \end{cases}$$



A)



B)



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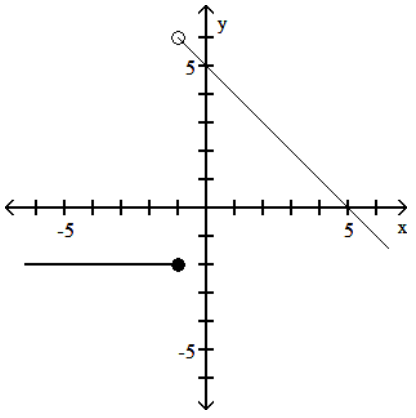
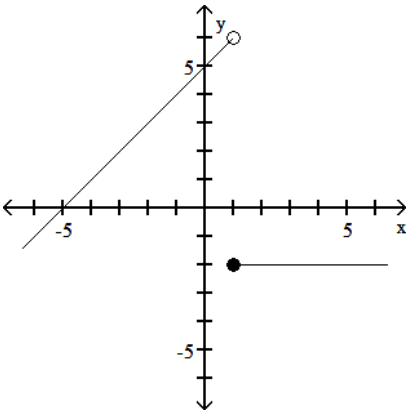


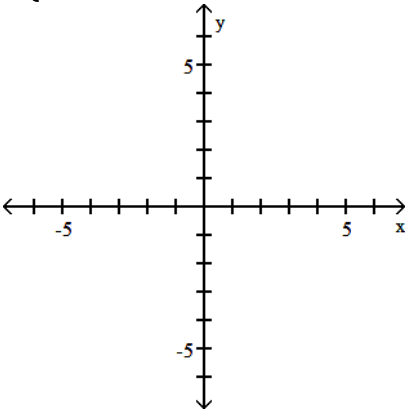
D)



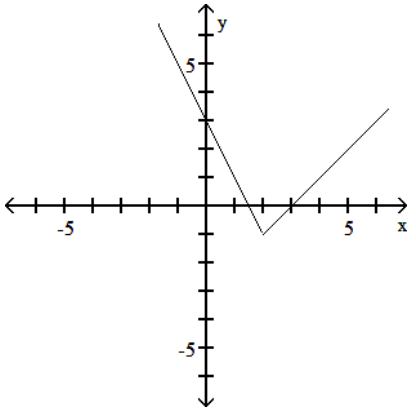
54)

54) _____

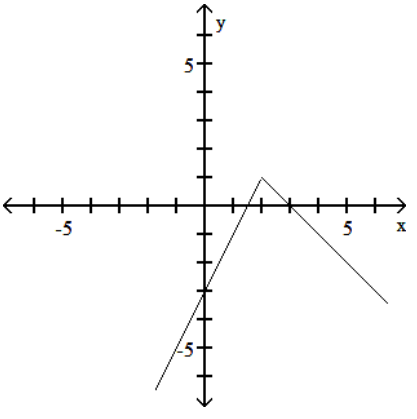
$$f(x) = \begin{cases} -x + 3 & \text{if } x < 2 \\ 2x - 3 & \text{if } x \geq 2 \end{cases}$$



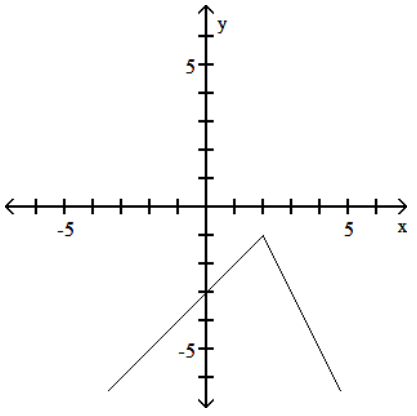
A)



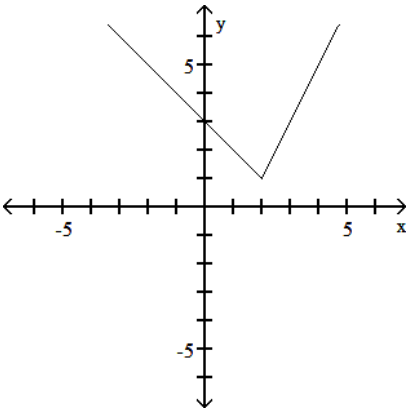
B)



C)

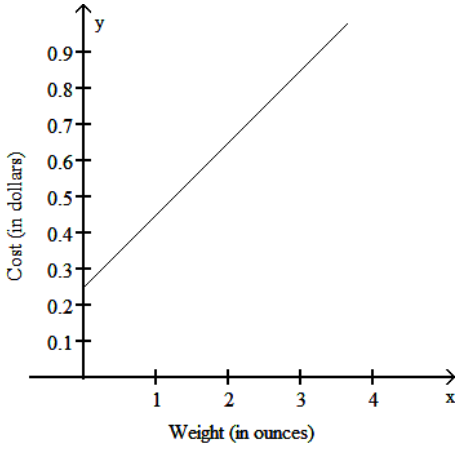


D)

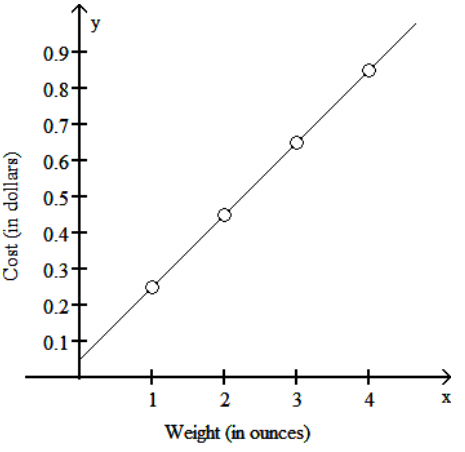


55) Assume it costs 25 cents to mail a letter weighing one ounce or less, and then 20 cents for each additional ounce or fraction of an ounce. Let L(x) be the cost of mailing a letter weighing x ounces. Graph y = L(x). Use the interval (0, 4]. 55) _____

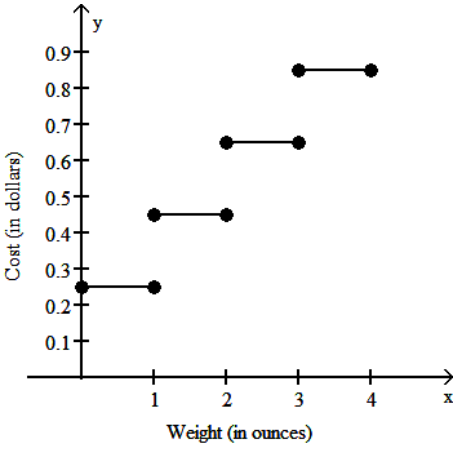
A)



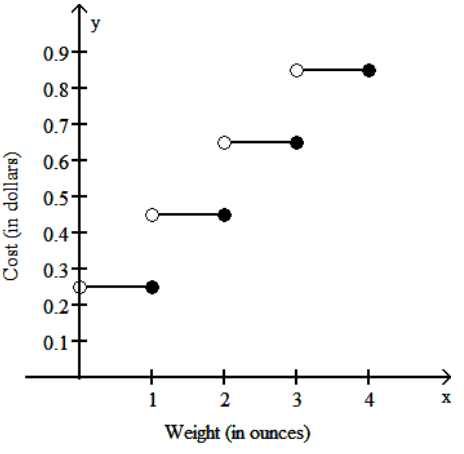
B)



C)



D)



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

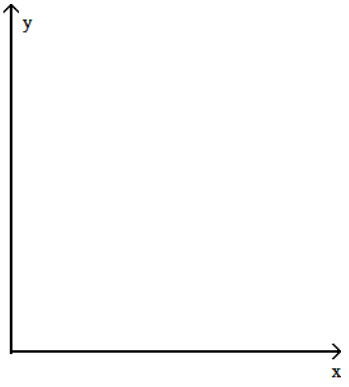
Provide an appropriate response.

56) If $f(x) = \begin{cases} x - 3 & \text{if } x < 2 \\ x^2 & \text{if } x \geq 2 \end{cases}$, what is the definition of g(x), the function whose graph is obtained by shifting f(x)'s graph right 5 units and down 1 unit? 56) _____

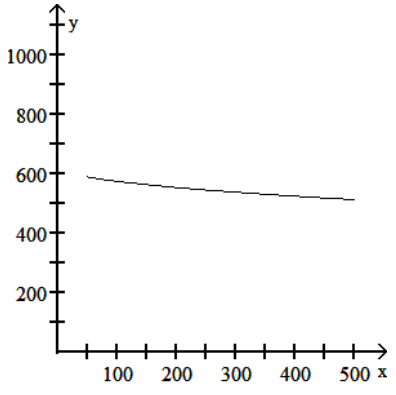
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

57) A retail chain sells washing machines. The retail price p(x) (in dollars) and the weekly demand x for a particular model are related by the function $p(x) = 625 - 5\sqrt{x}$, where $50 \leq x \leq 500$. (i) Describe how the graph of the function p can be obtained from the graph of one of the six basic functions: $y = x$, $y = x^2$, $y = x^3$, $y = \sqrt{x}$, $y = \sqrt[3]{x}$, or $y = |x|$. (ii) Sketch a graph of function p using part (i) as an aid. 57) _____

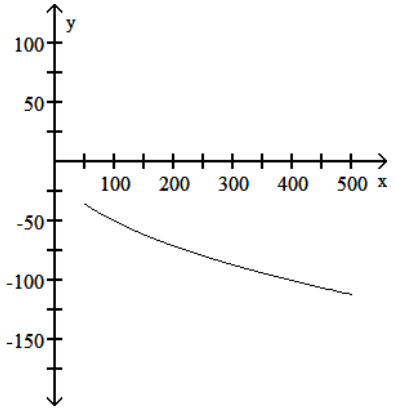


A) (i) The graph of the basic function $y = \sqrt{x}$ is reflected in the x-axis, vertically expanded by a factor of 5, and shifted up 625 units.
(ii)



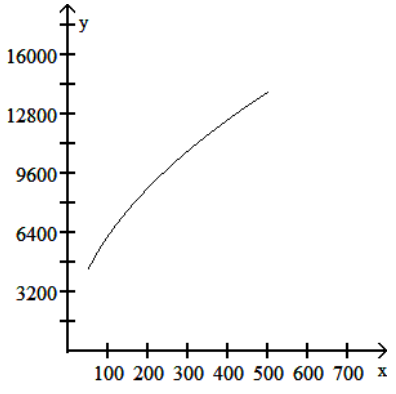
B) (i) The graph of the basic function $y = \sqrt{x}$ is reflected in the x-axis and vertically expanded by a factor of 5.

(ii)



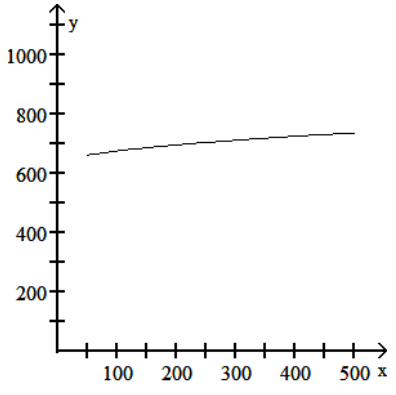
C) (i) The graph of the basic function $y = \sqrt{x}$ is vertically expanded by a factor of 625, and shifted up 5 units.

(ii)



D) (i) The graph of the basic function $y = \sqrt{x}$ is vertically expanded by a factor of 5, and shifted up 625 units.

(ii)



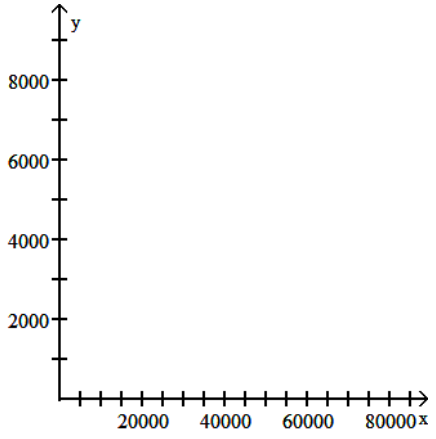
58) The following table shows a recent state income tax schedule for married couples filing a joint return in State X. 58) _____

State X Income Tax

SCHEDULE I - MARRIED FILING JOINTLY

If taxable income is		
Over	But not over	Tax due is
$0	$40,000	4.25% of taxable incomes
$40,000	$70,000	$3700 plus 6.75% of excess over $40,000
$70,000		$3875 plus 7.05% of excess over $70,000

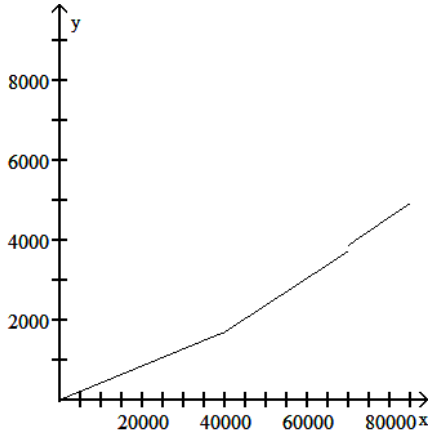
(i) Write a piecewise definition for the tax due T(x) on an income of x dollars. (ii) Graph T(x). (iii) Find the tax due on a taxable income of $50,000. Of $95,000.



A) (i)

$$T(x) = \begin{cases} 0.0425x & \text{if } 0 \le x \le 40{,}000 \\ 0.0675x - 1000 & \text{if } 40{,}000 < x \le 70{,}000 \\ 0.0705x - 1060 & \text{if } x > 70{,}000 \end{cases}$$

(ii)

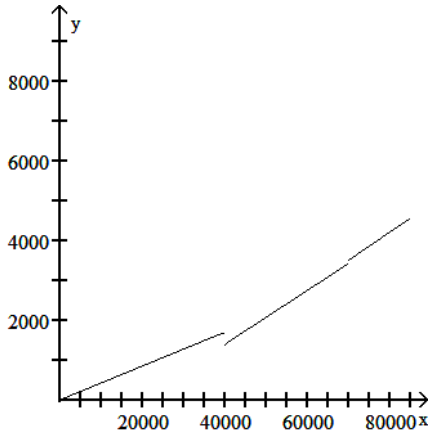


(iii) $2375; $5637.50

B) (i)

$$T(x) = \begin{cases} 0.0425x & \text{if } 0 \le x \le 40{,}000 \\ 0.0675x - 1300 & \text{if } 40{,}000 < x \le 70{,}000 \\ 0.0705x - 1427 & \text{if } x > 70{,}000 \end{cases}$$

(ii)

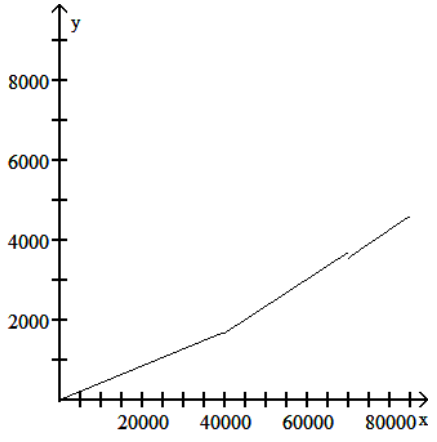


(iii) $2075; $5270.50

C) (i)

$$T(x) = \begin{cases} 0.0425x & \text{if } 0 \le x \le 40{,}000 \\ 0.0675x - 1025 & \text{if } 40{,}000 < x \le 70{,}000 \\ 0.0705x - 1375 & \text{if } x > 70{,}000 \end{cases}$$

(ii)

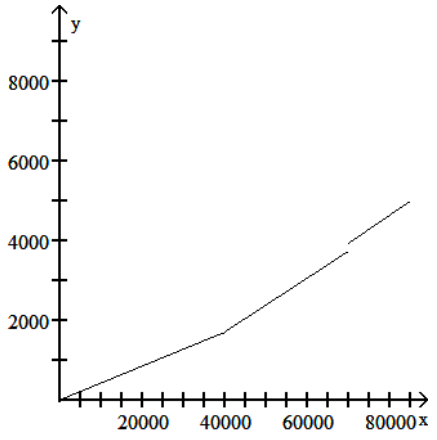


(iii) $2350; $5322.50

D) (i)

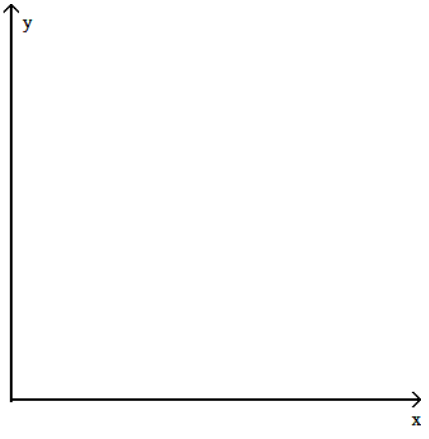
$$T(x) = \begin{cases} 0.0425x & \text{if } 0 \le x \le 40{,}000 \\ 0.0675x - 990 & \text{if } 40{,}000 < x \le 70{,}000 \\ 0.0705x - 1000 & \text{if } x > 70{,}000 \end{cases}$$

(ii)



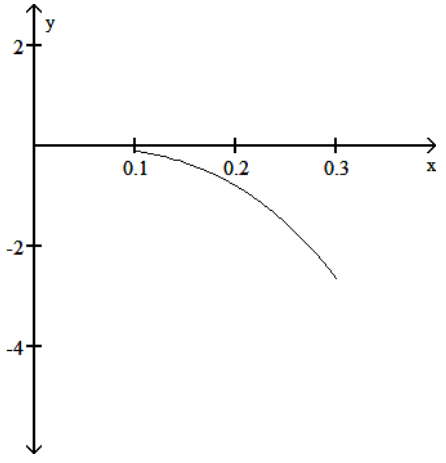
(iii) $2385; $5697.50

59) The average weight of a particular species of frog is given by $w(x) = 98x^3$, $0.1 \le x \le 0.3$, where x is length (with legs stretched out) in meters and w(x) is weight in grams. (i) Describe how the graph of function w can be obtained from one of the six basic functions: $y = x$, $y = x^2$, $y = x^3$, $y = \sqrt{x}$, $y = \sqrt[3]{x}$, or $y = |x|$. (ii) Sketch a graph of function w using part (i) as an aid. 59) _____



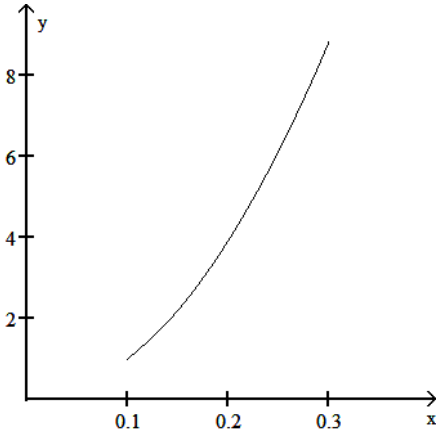
A) (i) The graph of the basic function $y = x^3$ is reflected on the x-axis and is vertically expanded by a factor of 98.

(ii)



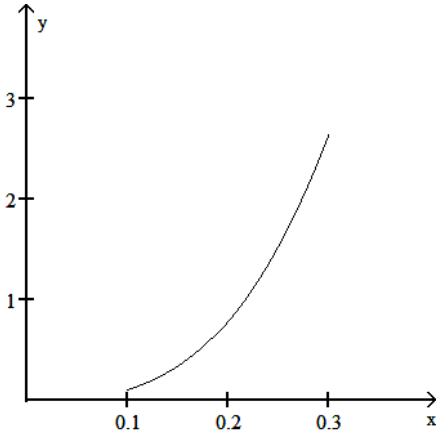
B) (i) The graph of the basic function $y = x^2$ is vertically expanded by a factor of 98.

(ii)



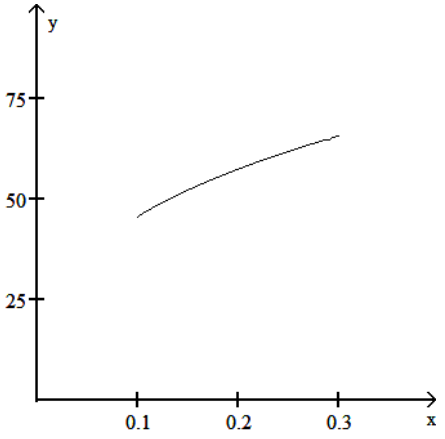
C) (i) The graph of the basic function $y = x^3$ is vertically expanded by a factor of 98.

(ii)



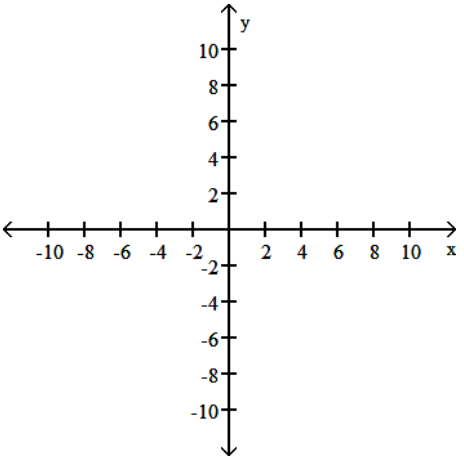
D) (i) The graph of the basic function $y = \sqrt[3]{x}$ is vertically expanded by a factor of 98.

(ii)

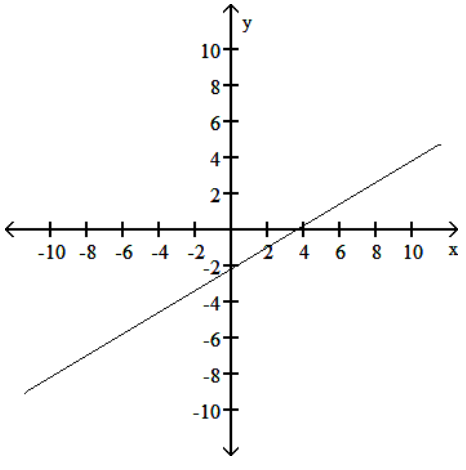


Graph the linear equation and determine its slope, if it exists.

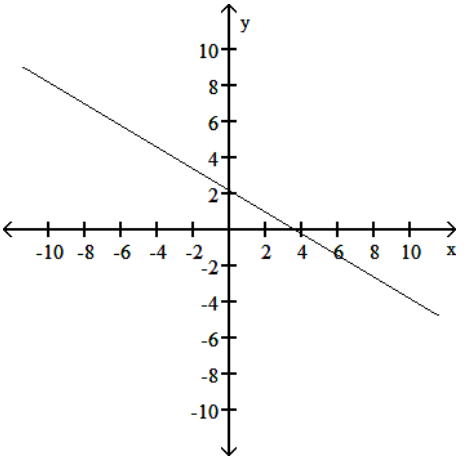
60) $3x + 5y = 11$ 60) _____



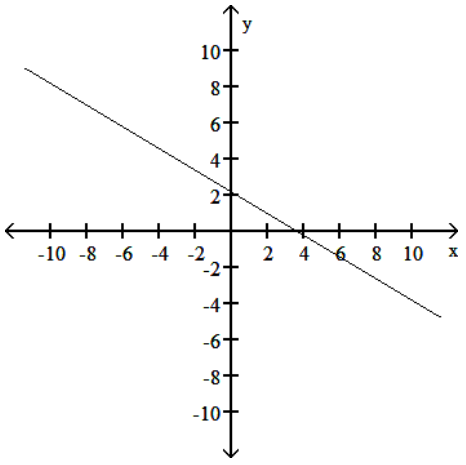
A) slope: $\frac{3}{4}$



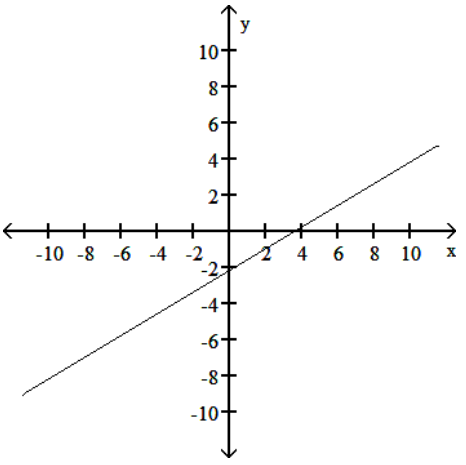
B) slope: $-\frac{3}{4}$



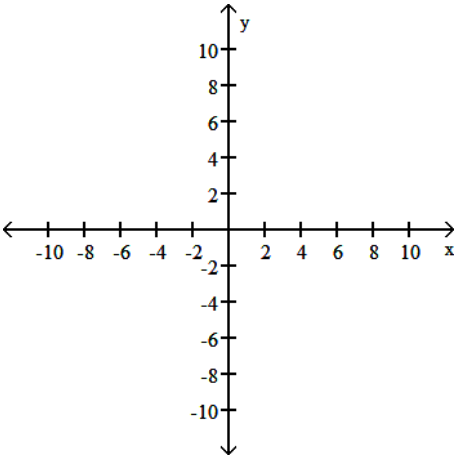
C) slope: $\frac{3}{4}$



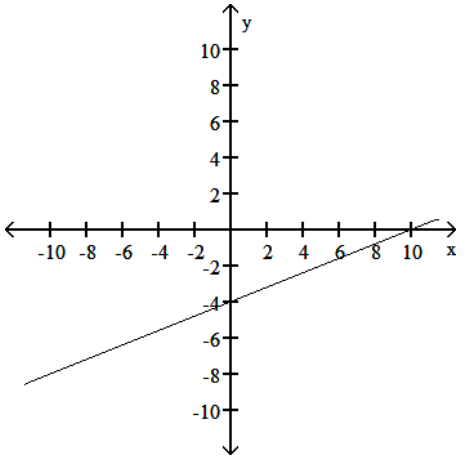
D) slope: $-\frac{3}{4}$



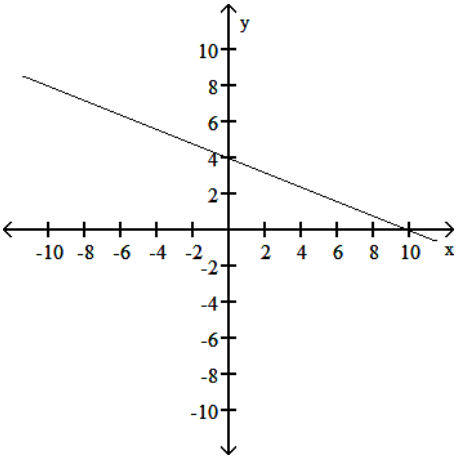
61) $2x - 5y = 20$ 61) _____



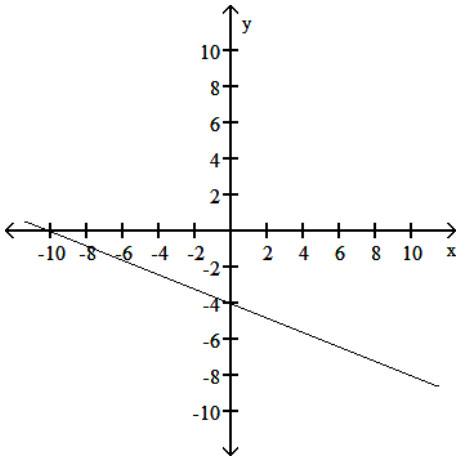
A) slope = $\frac{2}{5}$



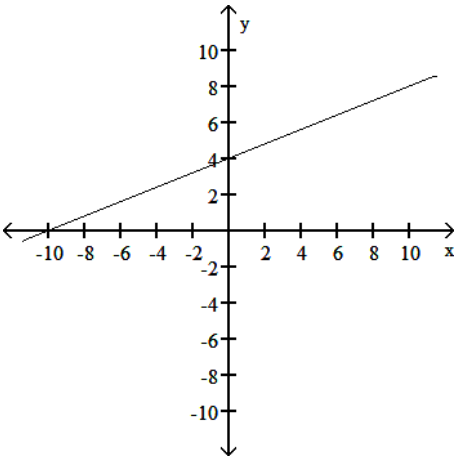
B) slope = $-\frac{2}{5}$



C) slope = $-\frac{2}{5}$



D) slope = $\frac{2}{5}$



Find the slope and y intercept of the graph of the equation.

62) y = 4x - 5 62) _____

A) Slope = 5, y intercept = 4
B) Slope = 4, y intercept = 5
C) Slope = -5, y intercept = 4
D) Slope = 4, y intercept = -5

63) y = -3x + 4 63) _____

A) Slope = 3, y intercept = -4
B) Slope = -3, y intercept = 4
C) Slope = 4, y intercept = -3
D) Slope = -4, y intercept = -3

64) y = $\frac{5}{2}$x - $\frac{9}{2}$ 64) _____

A) Slope = $\frac{5}{2}$; y intercept = $-\frac{9}{2}$
B) Slope = $-\frac{9}{2}$; y intercept = $\frac{5}{2}$
C) Slope = $\frac{9}{2}$; y intercept = $\frac{5}{2}$
D) Slope = $\frac{5}{2}$; y intercept = $\frac{9}{2}$

65) y = $-\frac{2}{5}$x + $\frac{19}{5}$ 65) _____

A) Slope = $\frac{2}{5}$; y intercept = $\frac{9}{5}$
B) Slope = $-\frac{2}{5}$; y intercept = $\frac{19}{5}$
C) Slope = $\frac{2}{5}$; y intercept = $\frac{19}{5}$
D) Slope = $\frac{5}{2}$; y intercept = $\frac{9}{5}$

66) y = $-\frac{x}{2}$ + 4 66) _____

A) Slope = $-\frac{1}{2}$; y intercept = -4
B) Slope = $-\frac{1}{2}$; y intercept = 4
C) Slope = 4; y intercept = $\frac{1}{2}$
D) Slope = 4; y intercept = $-\frac{1}{2}$

67) $y = x - 1$ 67) _____

A) Slope = 1; y intercept = -1
B) Slope = -1; y intercept = -1
C) Slope = 0; y intercept = 1
D) Slope = -1; y intercept = 1

Write an equation of the line with the indicated slope and y intercept.

68) Slope = 2, y intercept = -5 68) _____

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

69) Slope = -4, y intercept = 5 69) _____

A) $y = -4x + 5$ B) $y = 4x + 5$ C) $y = -4x - 5$ D) $y = 5x - 4$

70) Slope = $\frac{5}{2}$; y intercept = $-\frac{7}{2}$ 70) _____

A) $y = \frac{7}{2}x - \frac{5}{2}$ B) $y = \frac{5}{2}x + \frac{7}{2}$ C) $y = \frac{5}{2}x - \frac{7}{2}$ D) $y = -\frac{7}{2}x + \frac{5}{2}$

71) Slope = $-\frac{3}{4}$; y intercept = $\frac{9}{2}$ 71) _____

A) $y = \frac{3}{4}x + \frac{5}{2}$ B) $y = -\frac{3}{4}x + \frac{9}{2}$ C) $y = -\frac{4}{3}x + \frac{9}{2}$ D) $y = -\frac{3}{4}x - \frac{9}{2}$

72) Slope = $-\frac{1}{2}$; y intercept = -6 72) _____

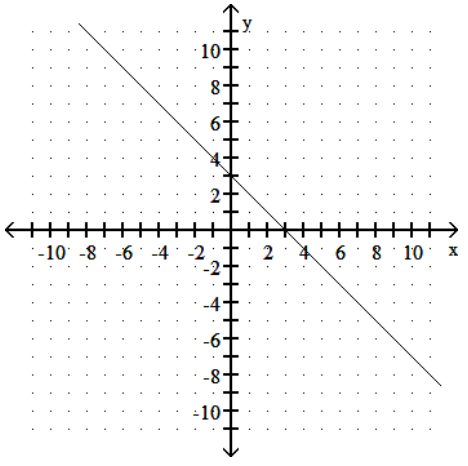
A) $y = -6x - \frac{1}{2}$ B) $y = \frac{x}{2} - 6$ C) $y = -\frac{x}{2} - 6$ D) $y = -6x + \frac{1}{2}$

73) Slope = 1; y intercept = 3 73) _____

A) $y = x + 3$ B) $y = 3x - 1$ C) $y = -x + 3$ D) $y = 3x + 1$

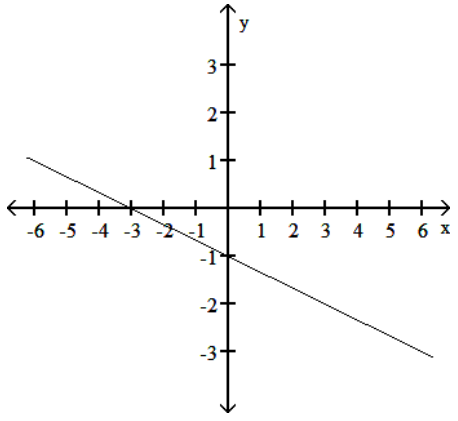
Provide an appropriate response.

74) Use the graph to find the slope-intercept form of the equation of the line. 74) _____



A) $y = -x + 3$ B) $y = 3x$ C) $y = x - 3$ D) $y = x + 3$

75) Write the equation of the line in the following graph. 75) _____



A) $f(x) = \frac{1}{3}x - 1$ B) $f(x) = -\frac{1}{3}x - 1$ C) $f(x) = -\frac{1}{3}x + 1$ D) $f(x) = \frac{1}{3}x + 1$

For the given function, find each of the following:
(A) Intercepts
(B) Vertex
(C) Maximum or minimum
(D) Range

76) $f(x) = (x + 4)^2 - 9$ 76) _____

A) (A) x-intercepts: $-7, -1$; y-intercept: 7
(B) Vertex (4, -9)
(C) Minimum: -9
(D) $y \geq -9$

B) (A) x-intercepts: 1, 7; y-intercept: 7
(B) Vertex (-4, -9)
(C) Minimum: -9
(D) $y \geq -9$

C) (A) x-intercepts: $-7, -1$; y-intercept: 7
(B) Vertex (-4, -9)
(C) Maximum: -9
(D) $y \leq -9$

D) (A) x-intercepts: $-7, -1$; y-intercept: 7
(B) Vertex (-4, -9)
(C) Minimum: -9
(D) $y \geq -9$

77) $g(x) = (x - 4)^2 - 9$ 77) _____

A) (A) x-intercepts: 1, 7; y-intercept: 7
(B) Vertex (-4, -9)
(C) Minimum: -9
(D) $y \geq -9$

B) (A) x-intercepts: 1, 7; y-intercept: 7
(B) Vertex (4, -9)
(C) Maximum: -9
(D) $y \leq -9$

C) (A) x-intercepts: $-7, -1$; y-intercept: 7
(B) Vertex (4, -9)
(C) Minimum: -9
(D) $y \geq -9$

D) (A) x-intercepts: 1, 7; y-intercept: 7
(B) Vertex (4, -9)
(C) Minimum: -9
(D) $y \geq -9$

78) $m(x) = -(x + 1)^2 + 4$ 78) _____

A) (A) x-intercepts: $-3, 1$; y-intercept: 3
(B) Vertex $(-1, 4)$
(C) Maximum: 4
(D) $y \le 4$

B) (A) x-intercepts: $-1, 3$; y-intercept: 3
(B) Vertex $(-1, 4)$
(C) Maximum: 4
(D) $y \le 4$

C) (A) x-intercepts: $-3, 1$; y-intercept: 3
(B) Vertex $(-1, 4)$
(C) Minimum: 4
(D) $y \ge 4$

D) (A) x-intercepts: $-3, 1$; y-intercept: 3
(B) Vertex $(1, -4)$
(C) Maximum: 4
(D) $y \le 4$

79) $n(x) = -(x - 2)^2 + 9$ 79) _____

A) (A) x-intercepts: $-1, 5$; y-intercept: 5
(B) Vertex $(2, 9)$
(C) Minimum: 9
(D) $y \ge 9$

B) (A) x-intercepts: $-1, 5$; y-intercept: 5
(B) Vertex $(2, 9)$
(C) Maximum: 9
(D) $y \le 9$

C) (A) x-intercepts: $-5, 1$; y-intercept: 5
(B) Vertex $(2, 9)$
(C) Maximum: 9
(D) $y \le 9$

D) (A) x-intercepts: $-1, 5$; y-intercept: 5
(B) Vertex $(-2, -9)$
(C) Maximum: 9
(D) $y \le 9$

Find the vertex form for the quadratic function. Then find each of the following:
(A) Intercepts
(B) Vertex
(C) Maximum or minimum
(D) Range

80) $f(x) = x^2 + 4x - 5$ 80) _____

A) Standard form: $f(x) = (x - 2)^2 - 9$
(A) x-intercepts: $-1, 5$; y-intercept: -5
(B) Vertex $(-2, -9)$
(C) Minimum: -9
(D) $y \ge -9$

B) Standard form: $f(x) = (x - 2)^2 - 9$
(A) x-intercepts: $-5, 1$; y-intercept: -5
(B) Vertex $(-2, -9)$
(C) Maximum: -9
(D) $y \le -9$

C) Standard form: $f(x) = (x + 2)^2 - 9$
(A) x-intercepts: $-5, 1$; y-intercept: -5
(B) Vertex $(2, -9)$
(C) Minimum: -9
(D) $y \ge -9$

D) Standard form: $f(x) = (x + 2)^2 - 9$
(A) x-intercepts: $-5, 1$; y-intercept: -5
(B) Vertex $(-2, -9)$
(C) Minimum: -9
(D) $y \ge -9$

81) $g(x) = x^2 - 4x - 5$ 81) _____

A) Standard form: $g(x) = (x - 2)^2 - 9$
(A) x-intercepts: $-1, 5$; y-intercept: -5
(B) Vertex $(-2, -9)$
(C) Minimum: -9
(D) $y \geq -9$

B) Standard form: $g(x) = (x - 2)^2 - 9$
(A) x-intercepts: $-1, 5$; y-intercept: -5
(B) Vertex $(2, -9)$
(C) Minimum: -9
(D) $y \geq -9$

C) Standard form: $g(x) = (x + 2)^2 - 9$
(A) x-intercepts: $-5, 1$; y-intercept: -5
(B) Vertex $(2, -9)$
(C) Minimum: -9
(D) $y \geq -9$

D) Standard form: $g(x) = (x + 2)^2 - 9$
(A) x-intercepts: $-1, 5$; y-intercept: -5
(B) Vertex $(2, -9)$
(C) Maximum: -9
(D) $y \leq -9$

82) $m(x) = -x^2 - 6x - 5$ 82) _____

A) Standard form: $m(x) = -(x + 3)^2 + 4$
(A) x-intercepts: $-5, -1$; y-intercept: -5
(B) Vertex $(3, -4)$
(C) Maximum: 4
(D) $y \leq 4$

B) Standard form: $m(x) = -(x - 3)^2 + 4$
(A) x-intercepts: $1, 5$; y-intercept: -5
(B) Vertex $(-3, 4)$
(C) Maximum: 4
(D) $y \leq 4$

C) Standard form: $m(x) = -(x - 3)^2 + 4$
(A) x-intercepts: $-5, -1$; y-intercept: -5
(B) Vertex $(-3, 4)$
(C) Minimum: 4
(D) $y \geq 4$

D) Standard form: $m(x) = -(x + 3)^2 + 4$
(A) x-intercepts: $-5, -1$; y-intercept: -5
(B) Vertex $(-3, 4)$
(C) Maximum: 4
(D) $y \leq 4$

83) $n(x) = -x^2 + 8x - 7$ 83) _____

A) Standard form: $n(x) = -(x + 4)^2 + 9$
(A) x-intercepts: $1, 7$; y-intercept: -7
(B) Vertex $(4, 9)$
(C) Minimum: 9
(D) $y \geq 9$

B) Standard form: $n(x) = -(x - 4)^2 + 9$
(A) x-intercepts: $1, 7$; y-intercept: -7
(B) Vertex $(-4, -9)$
(C) Maximum: 9
(D) $y \leq 9$

C) Standard form: $n(x) = -(x + 4)^2 + 9$
(A) x-intercepts: $-7, -1$; y-intercept: -7
(B) Vertex $(4, 9)$
(C) Maximum: 9
(D) $y \leq 9$

D) Standard form: $n(x) = -(x - 4)^2 + 9$
(A) x-intercepts: $1, 7$; y-intercept: -7
(B) Vertex $(4, 9)$
(C) Maximum: 9
(D) $y \leq 9$

Determine whether there is a maximum or minimum value for the given function, and find that value.

84) $f(x) = x^2 - 20x + 104$ 84) _____

A) Maximum: -4 B) Maximum: 10 C) Minimum: 0 D) Minimum: 4

85) $f(x) = -x^2 - 18x - 90$ 85) _____

A) Minimum: 9 B) Minimum: -9 C) Maximum: -9 D) Minimum: 0

Find the range of the given function. Express your answer in interval notation.

86) $f(x) = 4x^2 + 16x + 19$ 86) _____

A) $(-\infty, -3]$ B) $[-2, \infty)$ C) $(-\infty, 2]$ D) $[3, \infty)$

87) $f(x) = -2x^2 + 12x - 23$ 87) _____

A) $[5, \infty)$ B) $[-3, \infty)$ C) $(-\infty, -3]$ D) $(-\infty, -5]$

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

Provide an appropriate response.

88) Find the vertex and the maximum or minimum of the quadratic function $f(x) = -x^2 - 4x + 5$ by first writing f in standard form. State the range of f and find the intercepts of f . 88) _____

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

Find the slope of the line containing the given points.

89) (9, -2); (-2, 2) 89) _____

A) $\frac{4}{11}$ B) $\frac{11}{4}$ C) $-\frac{4}{11}$ D) $-\frac{11}{4}$

90) (6, 1) and (6, - 4) 90) _____

A) $-\frac{1}{4}$ B) - 4 C) 0 D) Undefined

91) (-5, 2) and (0, 2) 91) _____

A) $-\frac{5}{2}$ B) $\frac{5}{2}$ C) 0 D) Undefined

Provide an appropriate response.

92) Find the standard form of the equation of the line passing through the two points. (2, - 6) and (- 9, 6) 92) _____

A) 8x - 15y = - 18 B) - 12x + 11y = - 42

C) 12x + 11y = - 42 D) - 8x + 15y = - 18

93) Write the equation of a line that passes through (3, 9) and (0, -7). Write the final answer in the form Ax + By = C where A, B, and C are integers with no common divisors (other than ±1) and A > 0. 93) _____

A) 16x - 3y = 21 B) -16x + 3y = 21 C) 3x - 16y = 21 D) 16x - 3y = -21

94) Write the equation of a line that passes through (-1, 4) and (5, -1). Write the final answer in the form Ax + By = C where A, B, and C are integers with no common divisors (other than ±1) and A > 0. 94) _____

A) 5x + 6y = 19 B) 5x - 6y = 19 C) 5x + 6y = -19 D) -5x + 6y = 19

Use interval notation to write the solution set of the inequality.

95) $4x + 1 < 13$ 95) _____

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

96) $-9x - 45 \geq 0$ 96) _____

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

97) $x^2 - 3x - 18 \leq 0$ 97) _____

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

98) $x^2 + 4x + 3 > 0$ 98) _____

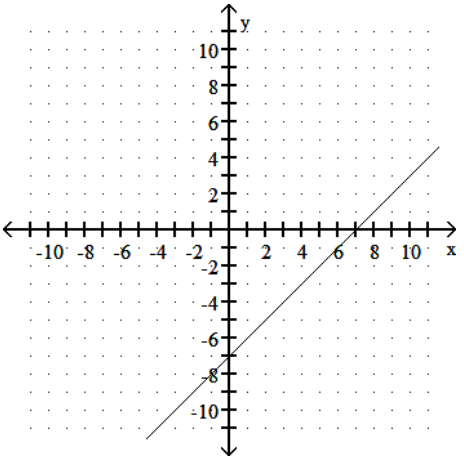
A) $(-\infty, -3)$ B) $(-\infty, -3) \cup (-1, \infty)$ C) $(-1, \infty)$ D) $(-3, -1)$

99) $x^2 + 8x \leq 0$ 99) _____

A) $(-\infty, 0] \cup [8, \infty)$ B) $[-8, 0]$ C) $[0, 8]$ D) $(-\infty, -8] \cup [0, \infty)$

Provide an appropriate response.

100) Use the graph to find the slope, x-intercept and y-intercept of the line. 100) _____



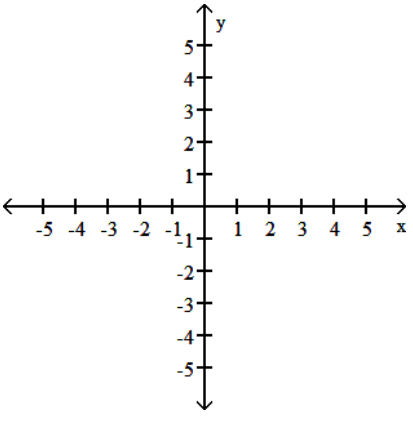
A) slope = - 1
x-intercept = (-7, 0)
y-intercept = (0, 7)

B) slope = -1
x-intercept = (7, 0)
y-intercept = (0, -7)

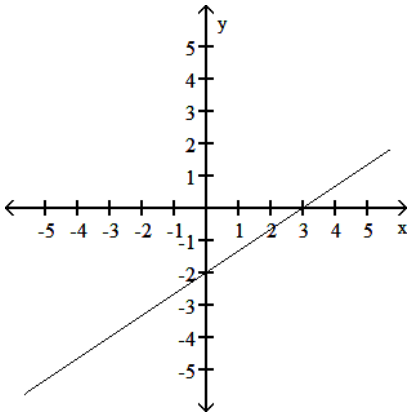
C) slope = 1
x-intercept = (7, 0)
y-intercept = (0, -7)

D) slope = 1
x-intercept = (0, 7)
y-intercept = (-7, 0)

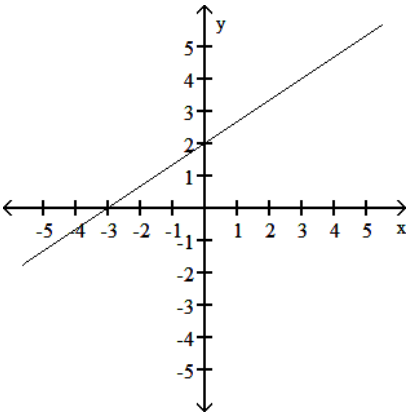
101) Graph the linear function defined by $f(x) = \frac{2}{3}x + 2$ and indicate the slope and intercepts. 101) _____



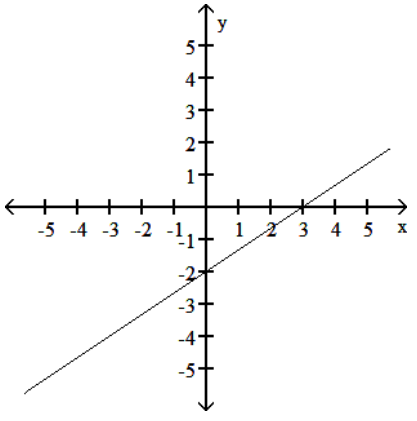
A) x-intercept = -2; y-intercept = 3; slope $\frac{2}{3}$



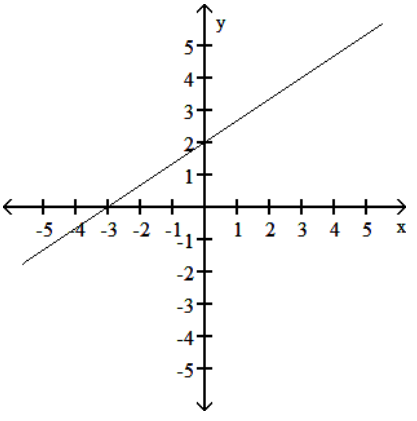
B) x-intercept = -3; y-intercept = 2; slope $\frac{2}{3}$



C) x-intercept = 3; y-intercept = -2; slope $\frac{2}{3}$



D) x-intercept = 2; y-intercept = -3; slope $\frac{2}{3}$



Solve graphically to two decimal places using a graphing calculator.

102) $1.7x^2 - 2.6x - 3.9 > 0$ 102) _____

A) $-2.46 < x < 0.93$
B) $x < -2.46$ or $x > 0.93$
C) $x < -0.93$ or $x > 2.46$
D) $-0.93 < x < 2.46$

103) $1.9x^2 - 3.1x - 2.7 \leq 0$ 103) _____

A) $-0.63 < x < 2.26$
B) $-2.26 < x < 0.63$
C) $x < -0.63$ or $x > 2.26$
D) $x < -2.26$ or $x > 0.63$

Solve the equation graphically to four decimal places.

104) Let $f(x) = -0.4x^2 + 2x + 3$, find $f(x) = 2$. 104) _____

A) No solution
B) -0.4580, 5.4580
C) -0.4580
D) 5.4580

105) Let $f(x) = -0.5x^2 + 4x + 2$, find $f(x) = -5$. 105) _____

A) 9.4772
B) -1.4772, 9.4772
C) No solution
D) -1.4772

106) Let $f(x) = -0.5x^2 + 4x + 2$, find $f(x) = 11$. 106) _____

A) 10.0000
B) No solution
C) 4.0000, 10.0000
D) 4.0000

Solve the problem.

107) The cost of manufacturing a computer part is related to the quantity produced, x, during a production run. When 100 parts are produced, the cost is $300. When 600 parts are produced, the cost is $4800. Find an equation of the line relating quantity produced to cost. Write the final answer in the form C = mx + b. 107) _____

A) C = 600x + 9 B) C = 9x + 600 C) C = 9x D) C = 9x - 600

108) The cost for labor associated with fixing a washing machine is computed as follows: There is a fixed charge of $25 for the repairman to come to the house, to which a charge of $20 per hour is added. Find an equation that can be used to determine the labor cost, C, of a repair that takes x hours. Write the final answer in the form C = mx + b. 108) _____

A) C = -20x + 25 B) C = 45x C) C = 20x + 25 D) C = 25x + 20

109) A small company that makes hand-sewn leather shoes has fixed costs of $320 a day, and total costs of $1200 per day at an output of 20 pairs of shoes per day. Assume that total cost C is linearly related to output x. Find an equation of the line relating output to cost. Write the final answer in the form C = mx + b. 109) _____

A) C = 60x + 320 B) C = 44x + 1520 C) C = 44x + 320 D) C = 60x + 1520

110) Using a phone card to make a long distance call costs a flat fee of $0.85 plus per $0.19 minute starting with the first minute. Find the total cost of a phone call which lasts 8 minutes. 110) _____

A) $8.16 B) $1.52 C) $6.00 D) $2.37

111) The mathematical model C = 600 x + 30,000 represents the cost in dollars a company has in manufacturing x items during a month. Using this model, how much does it cost to produce 600 items? 111) _____

A) $50.00 B) $390,000 C) $0.08 D) $360,000

112) In economics, functions that involve revenue, cost and profit are used. Suppose R(x) and C(x) denote the total revenue and the total cost, respectively, of producing a new high-tech widget. The difference P(x) = R(x) - C(x) represents the total profit for producing x widgets. Given R(x) = 60x - 0.4 x^2 and C(x) = 3x + 13, find the equation for P(x). 112) _____

A) P(x) = -0.4 x^2 + 57x - 13 B) P(x) = -0.4 x^2 + 63x + 13

C) P(x) = 3x + 13 D) P(x) = 60x - 0.4 x^2

113) In economics, functions that involve revenue, cost and profit are used. Suppose R(x) and C(x) denote the total revenue and the total cost, respectively, of producing a new high-tech widget. The difference P(x) = R(x) - C(x) represents the total profit for producing x widgets. Given R(x) = 60x - 0.4 x^2 and C(x) = 3x + 13, find P(100). 113) _____

A) 2000 B) 55687 C) 1687 D) 313

114) A professional basketball player has a vertical leap of 37 inches. A formula relating an athlete's vertical leap V, in inches, to hang time T, in seconds, is V= 48T^2. What is his hang time? Round to the nearest tenth. 114) _____

A) 0.6 sec B) 1 sec C) 0.8 sec D) 0.9 sec

115) Under certain conditions, the power P, in watts per hour, generated by a windmill with winds blowing v miles per hour is given by $P(v) = 0.015v^3$. Find the power generated by 18-mph winds. 115) _____

A) 58.32 watts per hour
B) 4.86 watts per hour
C) 87.48 watts per hour
D) 0.00006075 watts per hour

116) The U. S. Census Bureau compiles data on population. The population (in thousands) of a southern city can be approximated by $P(x) = 0.08x^2 - 13.08x + 927$, where x corresponds to the years after 1950. In what calendar year was the population about 804,200? 116) _____

A) 1955 B) 1965 C) 2000 D) 1960

117) Assume that a person's critical weight W, defined as the weight above which the risk of death rises dramatically, is given by $W(h) = \left(\frac{h}{11.9}\right)^3$, where W is in pounds and h is the person's height in inches. 117) _____

Find the tcritical weight for a person who is 6 ft 11 in. tall. Round to the nearest tenth.

A) 221.5 lb B) 377.4 lb C) 212.4 lb D) 339.3 lb

118) The polynomial $0.0053x^3 + 0.003x^2 + 0.108x + 1.54$ gives the approximate total earnings of a company, in millions of dollars, where x represents the number of years since 1996. This model is valid for the years from 1996 to 2000. Determine the earnings for 2000. Round to 2 decimal places. 118) _____

A) $2.36 million B) $2.26 million C) $2.03 million D) $2.82 million

Use the REGRESSION feature on a graphing calculator.

119) The paired data below consists of the temperature on randomly chosen days and the amount of a certain kind of plant grew (in millimeters). 119) _____

Temp, x	62	76	50	51	71	46	51	44	79
Growth, y	36	39	50	13	33	33	17	6	16

Find the linear function that predicts a plant's growth as a function of the temperature. Round your answer to two decimal places.

A) $y = -0.06x^2 + 7.20x - 191.23$
B) $y = 0.21x + 14.57$
C) $y = -9.19x^3 + 0.11x^2 - 2.90x + 6.54$
D) $y = 14..57x + 0.21$

120) The use of bottled water in the United States has shown a steady increase in recent years. The table shows the annual per capita consumption for the years 1995 - 2001. 120) _____

Year	1995	1996	1997	1998	1999	2000	2001
Gallons/person	4.4	5.1	5.7	6.4	7.3	8.0	10.2

With x being the years since 1995, find the linear function that represents this data. Round your answer to two decimal places.

A) $y = 0.89x + 4.07$
B) $y = 0.04x^3 - 0.23x^2 + 1.01x + 4.35$
C) $y = 4.07x + 0.89$
D) $y = 0.1x^2 + 0.29x + 4.57$

121) A study was conducted to compare the average time spent in the lab each week versus course grade for computer students. The results are recorded in the table below. 121) _____

Hours in lab	10	11	16	9	7	15	16	10
Grade (percent)	96	51	62	58	89	81	46	51

Use linear regression to find a linear function that predicts a student's course grade as a function of the number of hours spent in lab.

A) y = 0.930 + 44.3x
B) y = 44.3 + 0.930x
C) y = 88.6 - 1.86x
D) y = 1.86 + 88.6x

122) In the table below, x represents the number of years since 2000 and y represents sales (in thousands of dollars) of a clothing company. Use the regression equation to estimate sales in the year 2006. Round to the nearest thousand dollars. 122) _____

Year x	1	2	3	4	5
Sales y	84	76	39	30	26

A) $2,000 B) $14,000 C) $8,000 D) $20,000

123) For some reason the quality of production decreased as the year progressed at a flash drive manufacturing plant. The following data represent the percentage of defective flash drives produced at the plant in the corresponding month of the year. 123) _____

Month, x	2	3	5	7	8	9	12
% defective, y	1.3	1.6	2.0	2.4	2.6	2.8	3.1

Use the regression equation with values rounded to four decimals to predict the percentage of defective drives in month 6, June.

A) 2.3% B) 2.15% C) 2.20% D) 2.0%

124) Efficiency experts rate employees according to job performance and attitude. The results for several randomly selected employees are given below. 124) _____

Attitude, x	59	63	65	69	58	77	76	69	70	64
Performance, y	72	67	78	82	75	87	92	83	87	78

Find the regression line which can be used to predict performance rating if attitude rating is known.

A) y = 11.7 + 1.02x
B) y = -47.3 + 2.02x
C) y = 92.3 - 0.669x
D) y = 2.81 + 1.35x

125) The average retail price in the Spring of 2000 for a used Camaro Z28 coupe depends on the age of the car as shown in the following table. 125) _____

Age, x	1	2	3	4	5	6	7	8	9
Price, y	18,325	15,925	13,685	11,805	10,490	8885	8015	6480	5710

Find the quadratic model that best estimates this data. Round your answer to whole numbers.

A) y = -1551x + 18,790x
B) $y = -9x^3 + 235x^2 - 3134x + 21,252$
C) $y = 102x^2 - 2576x + 20,669$
D) $y = 102x^2 - 2576x$

126) As the number of farms has decreased in South Carolina, the average size of the remaining farms has grown larger, as shown below. 126) _____

YEAR	AVERAGE ACREAGE PER FARM
1900 (x = 0)	127
1910 (x = 10)	119
1920	135
1930	137
1940	155
1950	196
1960	283
1970	353
1980	406
1990	440
2000 (x = 100)	420

Let x represent the number of years since 1900. Use a graphing calculator to fit a quadratic function to the data. Round your answer to five decimal places.

A) $y = 0.02536x^3 + 1.21114x + 102.58741$

B) $y = 0.02536x^2 + 1.21114x + 102.58741$

C) $y = 0.02536x^3 + 1.21114 + 102.58741$

D) $y = -.00114x^3 + 0.19605x^2 - 5.29775 + 143.55245$

127) Since 1984 funeral directors have been regulated by the Federal Trade Commission. The average cost of a funeral for an adult in a Midwest city has increased, as shown in the following table. 127) _____

YEAR	AVERAGE COST OF FUNERAL
1980	$ 1926
1985	$ 2841
1991	$ 3842
1995	$ 4713
1996	$ 4830
1998	$ 5120
2001	$ 5340

Let x represent the number of years since 1980. Use a graphing calculator to fit a quartic function to the data. Round your answer to five decimal places.

A) $y = 170.5971x + 1991.5213$

B) $y = -2.047489x^2 + 212.82699x + 1879.85469$

C) $y = -0.04268x^4$

D) $y = -0.04268x^4 + 1.53645x^3 - 16.76289x^2 + 231.82723x + 1927.58518$

Solve the problem.

128) Suppose the sales of a particular brand of MP3 player satisfy the relationship $S = 200x + 3800$, where S represents the number of sales in year x, with x = 0 corresponding to 2002 . Find the number of sales in 2005. 128) _____

A) 12,600 B) 4400 C) 4200 D) 6400

129) The population P, in thousands, of Fayetteville is given by $P(t) = \frac{300t}{2t^2 + 7}$, where t is the time, in months. Find the population at 9 months. 129) _____

A) 7988 B) 30, 769 C) 15, 976 D) 40,000

130) If the average cost per unit C(x) to produce x units of plywood is given by $C(x) = \frac{1200}{x + 40}$, what is the unit cost for 10 units? 130) _____

A) \$80.00 B) \$3.00 C) \$24.00 D) \$120.00

131) Suppose the cost per ton, y, to build an oil platform of x thousand tons is approximated by $C(x) = \frac{212{,}500}{x + 425}$. What is the cost per ton for x = 30? 131) _____

A) \$425.00 B) \$467.03 C) \$16.67 D) \$7083.33

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

132) The financial department of a company that produces digital cameras arrived at the following price-demand function and the corresponding revenue function: 132) _____

$p(x) = 95.4 - 6x$ price-demand
$R(x) = x \cdot p(x) = x(95.4 - 6x)$ revenue function

The function p(x) is the wholesale price per camera at which x million cameras can be sold and R(x) is the corresponding revenue (in million dollars). Both functions have domain $1 \le x \le 15$. They also found the cost function to be C(x) = 150 + 15.1x (in million dollars) for manufacturing and selling x cameras. Find the profit function and determine the approximate number of cameras, rounded to the nearest hundredths, that should be sold for maximum profit.

133) The financial department of a company that manufactures portable MP3 players arrived at the following daily cost equation for manufacturing x MP3 players per day: $C(x) = 1500 + 105x + x^2$. The average cost per unit at a production level of players per day is $\overline{C}(x) = \frac{C(x)}{x}$. 133) _____

(A) Find the rational function $\overline{C}$.
(B) Graph the average cost function on a graphing utility for $10 \le x \le 200$.
(C) Use the appropriate command on a graphing utility to find the daily production level (to the nearest integer) at which the average cost per player is a minimum. What is the minimum average cost (to the nearest cent)?

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

For the polynomial function find the following: (i) Degree of the polynomial; (ii) All x intercepts; (iii) The y intercept.

134) y = 7x + 5 134) _____

A) (i) 1
(ii) $\frac{5}{7}$
(iii) 5

B) (i) 1
(ii) $-\frac{7}{5}$
(iii) 7

C) (i) 1
(ii) 5
(iii) $\frac{5}{7}$

D) (i) 1
(ii) $-\frac{5}{7}$
(iii) 5

135) $y = x^2 - 36$ 135) _____

A) (i) 2
(ii) -6, 6
(iii) -36

B) (i) 1
(ii) 6
(iii) -36

C) (i) 1
(ii) 18
(iii) -36

D) (i) 2
(ii) -7, 7
(iii) -36

136) $y = x^2 + 7x - 30$ 136) _____

A) (i) 2
(ii) -10, 1
(iii) -30

B) (i) 2
(ii) 10, -3
(iii) -30

C) (i) 2
(ii) 10, 3
(iii) -30

D) (i) 2
(ii) -10, 3
(iii) -30

137) $y = 18 - x^2 + 3x$ 137) _____

A) (i) 2
(ii) 6, 3
(iii) 18

B) (i) 2
(ii) 3, -6
(iii) -18

C) (i) 2
(ii) 6, -3
(iii) 18

D) (i) 2
(ii) -3, -6
(iii) -18

138) $y = (x + 3)(x + 1)(x + 3)$ 138) _____

A) (i) 3
(ii) -3, -1, -3
(iii) 9

B) (i) 3
(ii) 3, 1, 3
(iii) 3

C) (i) 3
(ii) -3, -1, -3
(iii) -3

D) (i) 3
(ii) 3, 1, 3
(iii) 9

139) $f(x) = (x^6 + 7)(x^{10} + 9)$ 139) _____

A) (i) 16
(ii) 7, 9
(iii) 63

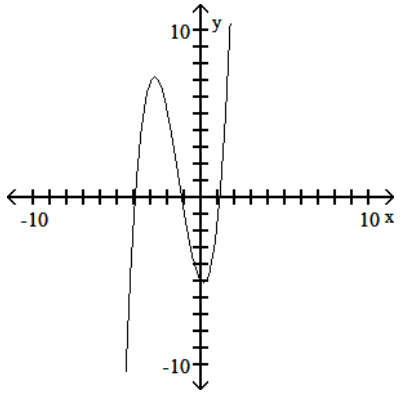
B) (i) 60
(ii) 7, 9
(iii) -63

C) (i) 60
(ii) none
(iii) -63

D) (i) 16
(ii) none
(iii) 63

The graph that follows is the graph of a polynomial function. (i) What is the minimum degree of a polynomial function that could have the graph? (ii) Is the leading coefficient of the polynomial negative or positive?

140) 140) _____



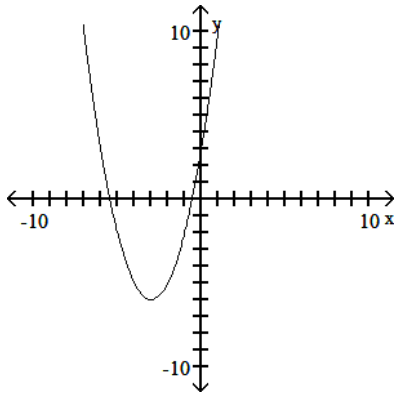
A) (i) 3
(ii) Negative

B) (i) 2
(ii) Positive

C) (i) 2
(ii) Negative

D) (i) 3
(ii) Positive

141) 141) _____



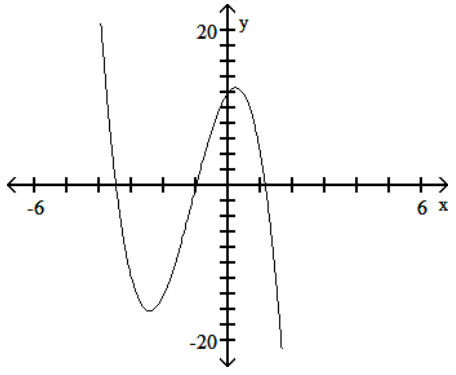
A) (i) 3
(ii) Negative

B) (i) 3
(ii) Positive

C) (i) 2
(ii) Negative

D) (i) 2
(ii) Positive

142) 142) _____



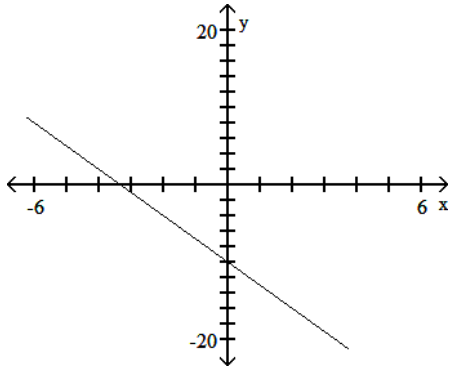
A) (i) 3
(ii) Positive

B) (i) 4
(ii) Positive

C) (i) 4
(ii) Negative

D) (i) 3
(ii) Negative

143) 143) _____

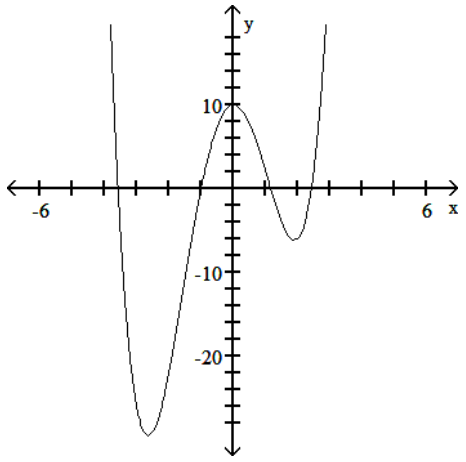


A) (i) 1
(ii) Negative

B) (i) 1
(ii) Positive

C) (i) 2
(ii) Negative

D) (i) 2
(ii) Positive

144) 

144) _____

A) (i) 4
(ii) Negative

B) (i) 3
(ii) Positive

C) (i) 3
(ii) Negative

D) (i) 4
(ii) Positive

Provide an appropriate response.

145) What is the maximum number of x intercepts that a polynomial of degree 10 can have? 145) _____

A) 11
B) 10
C) 9
D) Not enough information is given.

146) What is the minimum number of x intercepts that a polynomial of degree 11 can have? Explain. 146) _____

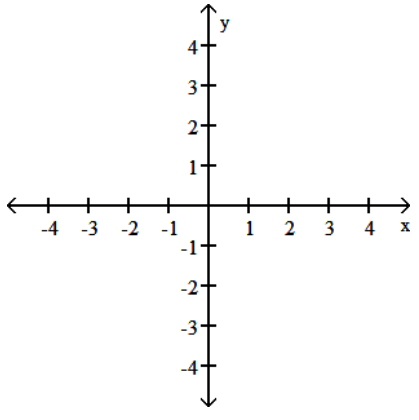
A) 11 because this is the degree of the polynomial.
B) 0 because a polynomial of odd degree may not cross the x axis at all.
C) 1 because a polynomial of odd degree crosses the x axis at least once.
D) Not enough information is given.

147) What is the minimum number of x intercepts that a polynomial of degree 8 can have? Explain. 147) _____

A) 1 because a polynomial of even degree crosses the x axis at least once.
B) 0 because a polynomial of even degree may not cross the x axis at all.
C) 8 because this is the degree of the polynomial.
D) Not enough information is given.

For the rational function below (i) Find the intercepts for the graph; (ii) Determine the domain; (iii) Find any vertical or horizontal asymptotes for the graph; (iv) Sketch any asymptotes as dashed lines. Then sketch the graph of y = f(x).

148) $f(x) = \frac{x + 2}{x + 1}$ 148) _____

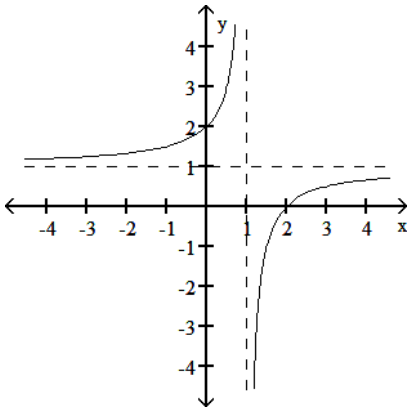


A) (i) x intercept: 2; y intercept: 2

(ii) Domain: all real numbers except 1

(iii) Vertical asymptote: x = 1; horizontal asymptote: y = 1

(iv)

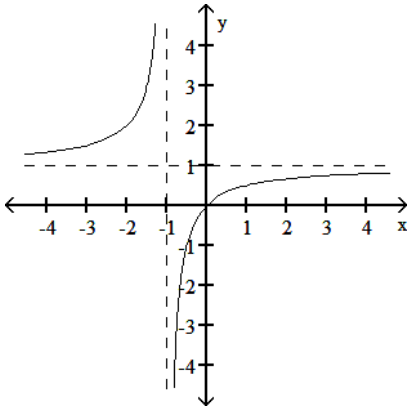


B) (i) x intercept: 0; y intercept: 0

(ii) Domain: all real numbers except -1

(iii) Vertical asymptote: x = -1; horizontal asymptote: y = 1

(iv)

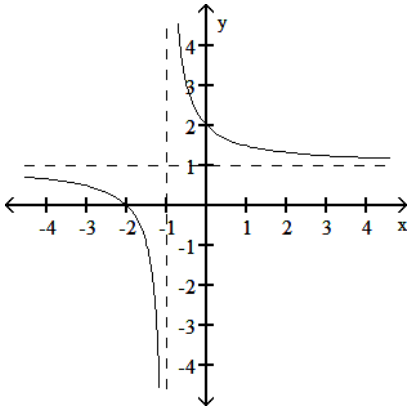


C) (i) x intercept: -2; y intercept: 2

(ii) Domain: all real numbers except -1

(iii) Vertical asymptote: x = -1; horizontal asymptote: y = 1

(iv)

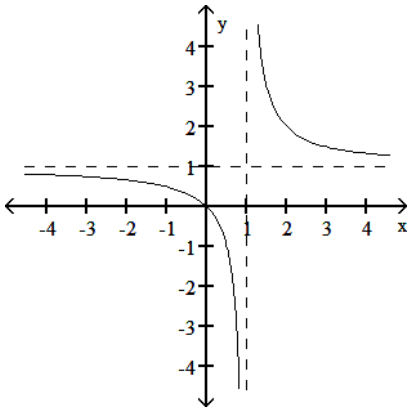


D) (i) x intercept: 0; y intercept: 0

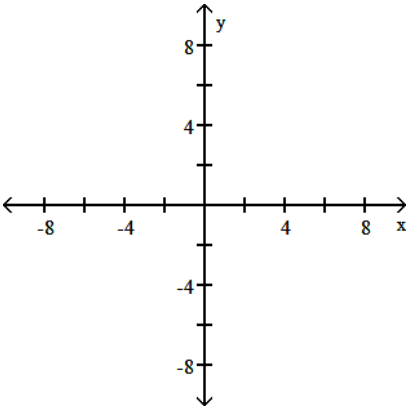
(ii) Domain: all real numbers except 1

(iii) Vertical asymptote: x = 1; horizontal asymptote: y = 1

(iv)



149) $f(x) = \frac{x - 3}{x - 4}$ 149) _____

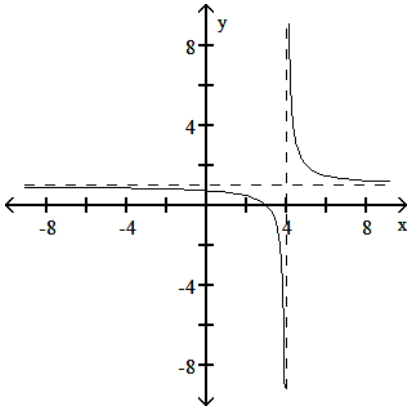


A) (i) x intercept: 3; y intercept: $\frac{3}{4}$

(ii) Domain: all real numbers except 4

(iii) Vertical asymptote: x = 4; horizontal asymptote: y = 1

(iv)

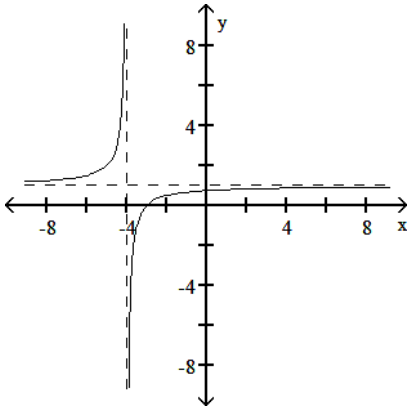


B) (i) x intercept: -3; y intercept: $\frac{3}{4}$

(ii) Domain: all real numbers except -4

(iii) Vertical asymptote: x = -4; horizontal asymptote: y = 1

(iv)

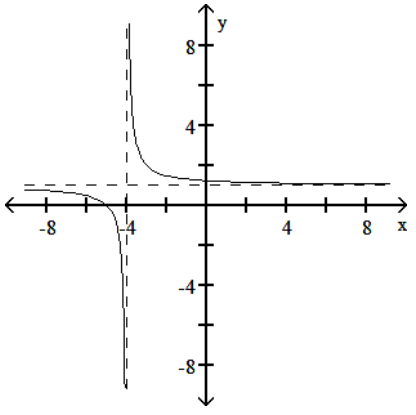


C) (i) x intercept: -5; y intercept: $\frac{3}{4}$

(ii) Domain: all real numbers except -4

(iii) Vertical asymptote: x = -4; horizontal asymptote: y = 1

(iv)

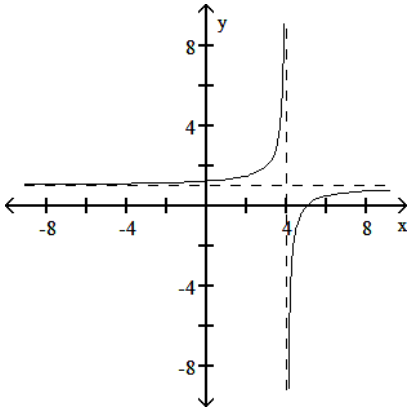


D) (i) x intercept: 5; y intercept: $\frac{3}{4}$

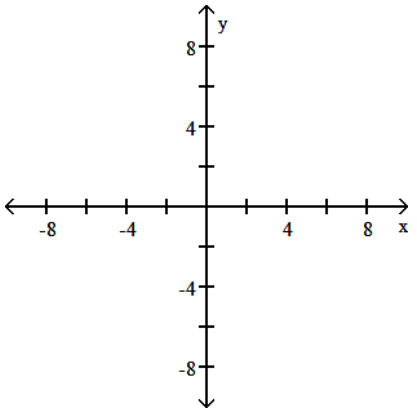
(ii) Domain: all real numbers except 4

(iii) Vertical asymptote: x = 4; horizontal asymptote: y = 1

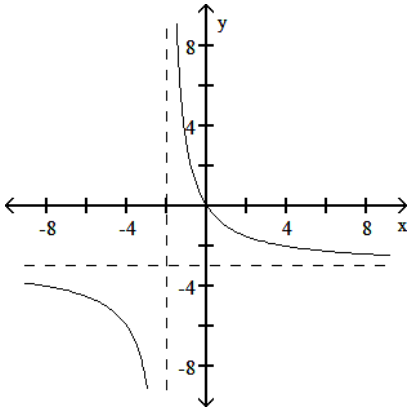
(iv)



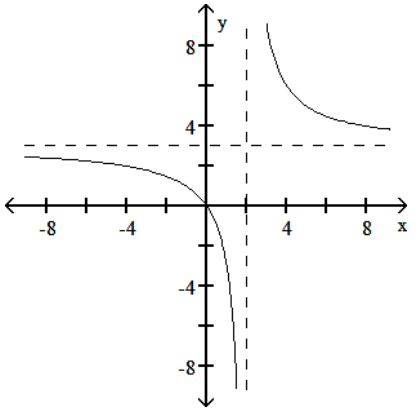
150) $f(x) = \frac{3x}{x - 2}$ 150) _____



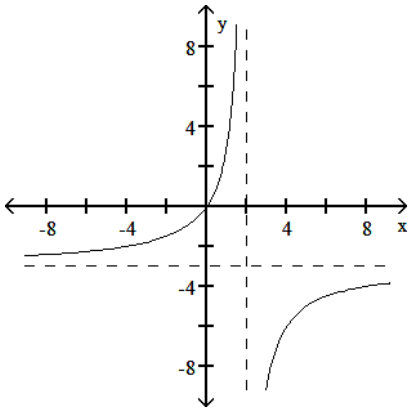
A) (i) x intercept: 0; y intercept: 0
(ii) Domain: all real numbers except -2
(iii) Vertical asymptote: x = -2; horizontal asymptote: y = -3
(iv)



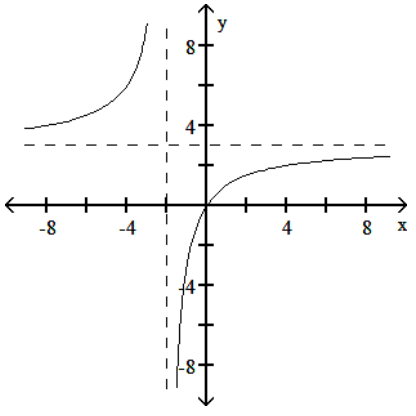
B) (i) x intercept: 0; y intercept: 0
(ii) Domain: all real numbers except 2
(iii) Vertical asymptote: x = 2; horizontal asymptote: y = 3
(iv)



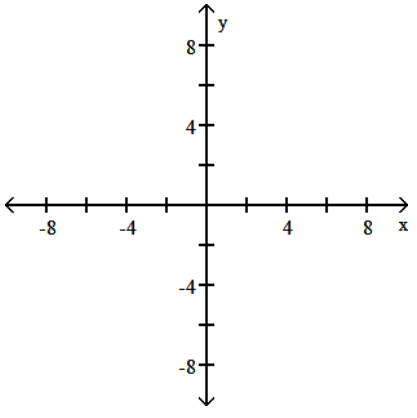
C) (i) x intercept: 0; y intercept: 0
(ii) Domain: all real numbers except 2
(iii) Vertical asymptote: x = 2; horizontal asymptote: y = -3
(iv)



D) (i) x intercept: 0; y intercept: 0
(ii) Domain: all real numbers except -2
(iii) Vertical asymptote: x = -2; horizontal asymptote: y = 3
(iv)



151) $f(x) = \frac{-2x - 3}{x + 2}$ 151) _____

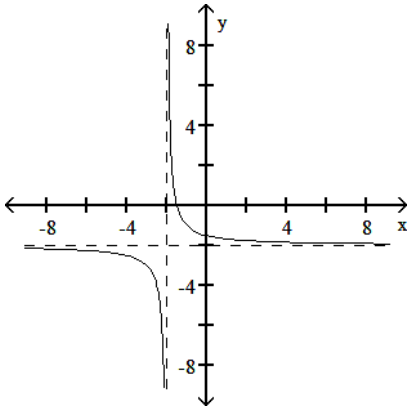


A) (i) x intercept: $-\frac{3}{2}$; y intercept: $-\frac{3}{2}$

(ii) Domain: all real numbers except -2

(iii) Vertical asymptote: x = -2; horizontal asymptote: y = -2

(iv)

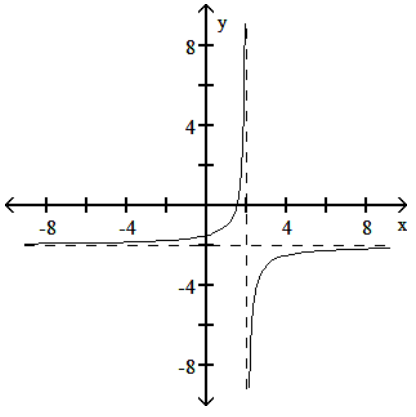


B) (i) x intercept: $\frac{3}{2}$; y intercept: $-\frac{3}{2}$

(ii) Domain: all real numbers except 2

(iii) Vertical asymptote: x = 2; horizontal asymptote: y = -2

(iv)

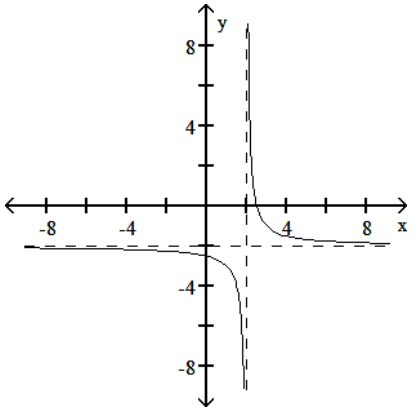


C) (i) x intercept: $\frac{3}{2}$; y intercept: $-\frac{3}{2}$

(ii) Domain: all real numbers except 2

(iii) Vertical asymptote: x = 2; horizontal asymptote: y = -2

(iv)

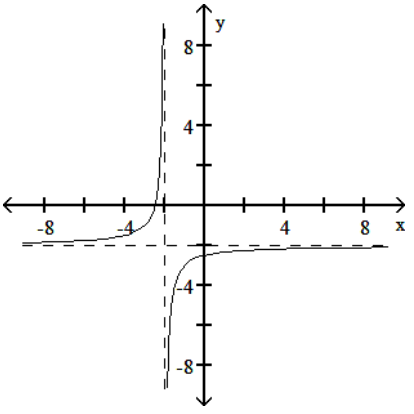


D) (i) x intercept: $-\frac{3}{2}$; y intercept: $-\frac{3}{2}$

(ii) Domain: all real numbers except -2

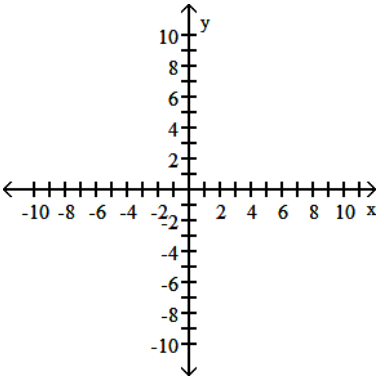
(iii) Vertical asymptote: x = -2; horizontal asymptote: y = -2

(iv)



For the rational function below (i) Find any intercepts for the graph; (ii) Find any vertical and horizontal asymptotes for the graph; (iii) Sketch any asymptotes as dashed lines. Then sketch a graph of f.

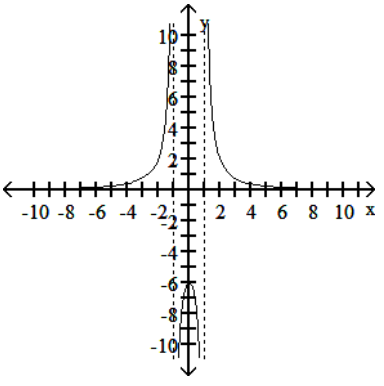
152) $y = \frac{6}{x^2 - 1}$ 152) _____



A) (i) y intercept: -6

(ii) horizontal asymptote: y = 0; vertical asymptotes: x = 1 and x = -1

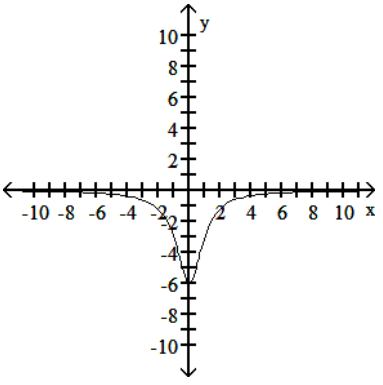
(iii)



B) (i) y intercept: - 6

(ii) horizontal asymptote: y = 0

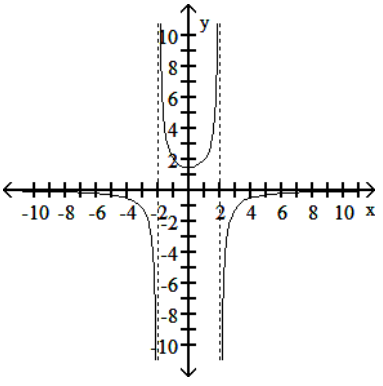
(iii)



C) (i) y intercept: 2

(ii) horizontal asymptote: y = 0; vertical asymptotes: x = 2 and x = - 2

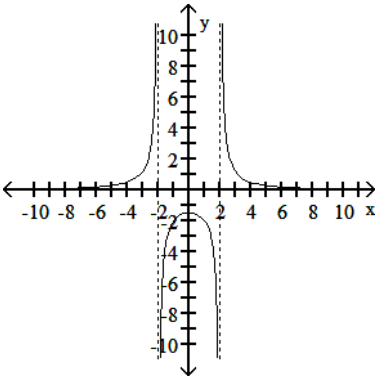
(iii)



D) (i) y intercept: - 2

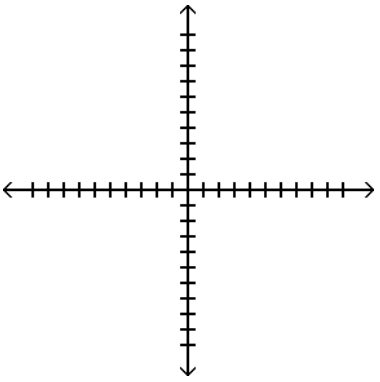
(ii) horizontal asymptote: y = 0; vertical asymptotes: x = 2 and x = - 2

(iii)

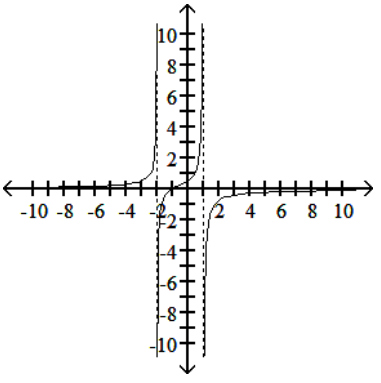


Sketch the graph of the function.

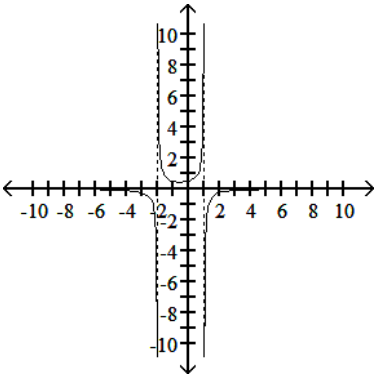
153) $f(x) = \dfrac{x + 1}{x^2 + x - 2}$ 153) _____



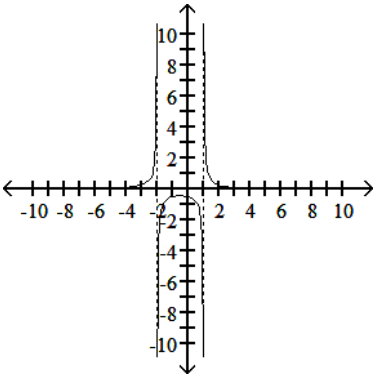
A)



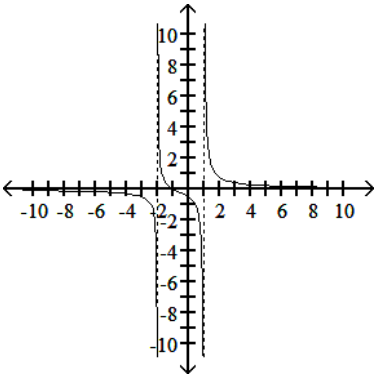
B)



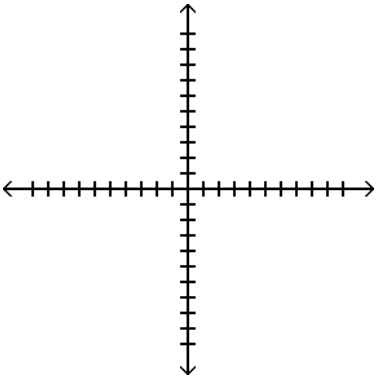
C)



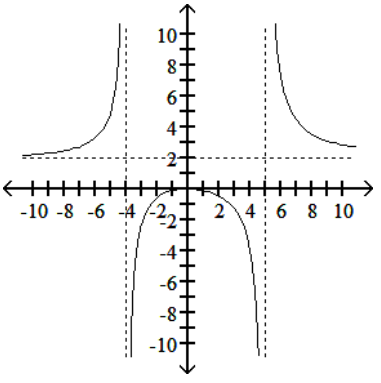
D)



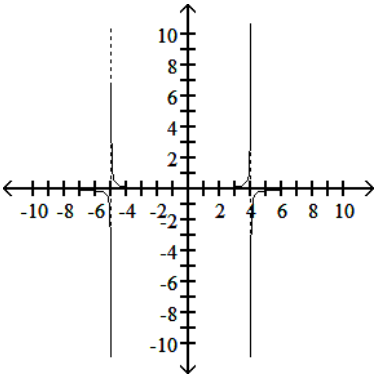
154) $f(x) = \dfrac{x^2}{x^2 - x - 20}$ 154) _____



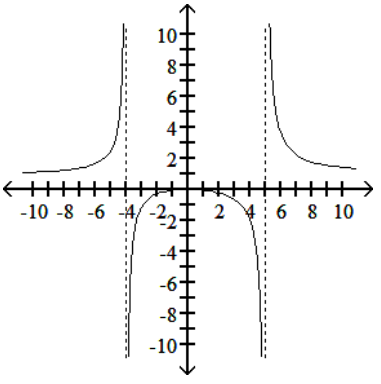
A)



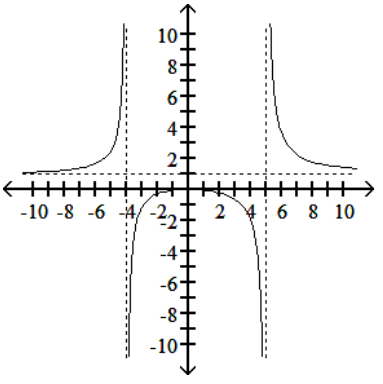
B)



C)



D)



Find the equation of any horizontal asymptote.

155) $f(x) = \dfrac{9x^2 - 5x - 7}{5x^2 - 2x + 8}$ 155) _____

A) y = 0 B) $y = \dfrac{5}{2}$ C) $y = \dfrac{9}{5}$ D) None

156) $f(x) = \dfrac{5x^2 + 5}{5x^2 - 5}$ 156) _____

A) y = 5 B) y = 1 C) y = -5 D) None

157) $f(x) = \frac{x^2 + 6x - 6}{x - 6}$ 157) _____

A) None B) y = -6 C) y = 7 D) y = 6

Find the equations of any vertical asymptotes.

158) $f(x) = \frac{4x - 11}{x^2 + 2x - 3}$ 158) _____

A) y = 4 B) x = -1, x = 3 C) y = 1, y = -3 D) x = 1, x = -3

159) $f(x) = \frac{x^2 - 100}{(x - 1)(x + 1)}$ 159) _____

A) x = -1 B) y = 1, y = -1 C) x = 1, x = -1 D) x = 10, x = -10

160) $f(x) = \frac{x^2 + 6x}{x^2 - 2x - 48}$ 160) _____

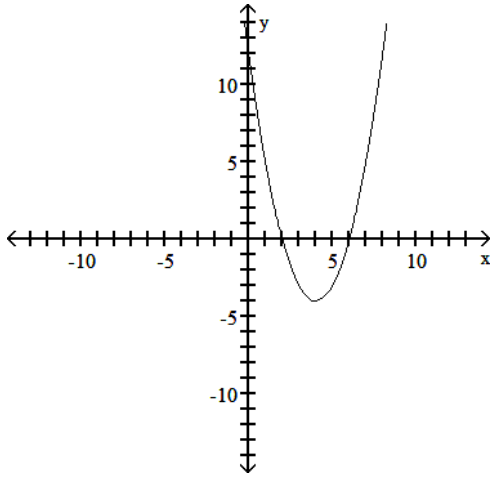
A) x = 8 B) x = -8, x = 6 C) x = 8, x = -6 D) None

161) $f(x) = \frac{x - 1}{x^2 + 3}$ 161) _____

A) x = 3 B) x = -3 C) x = 1, x = -1 D) None

Write an equation for the lowest-degree polynomial function with the graph and intercepts shown in the figure.

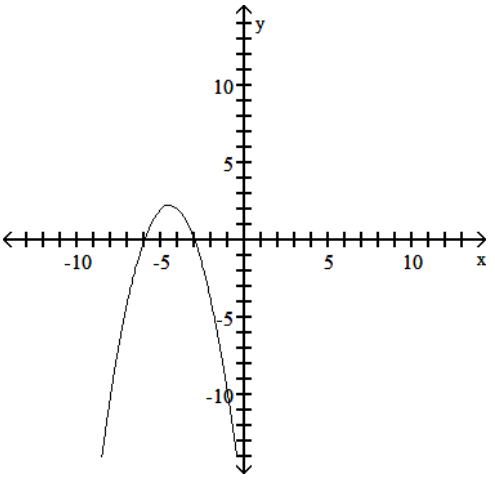
162) 162) _____



A) $f(x) = x^2 - 8x + 12$ B) $f(x) = x^2 + 12x - 8$

C) $f(x) = x^2 + 8x + 12$ D) $f(x) = x^2 + 12x + 8$

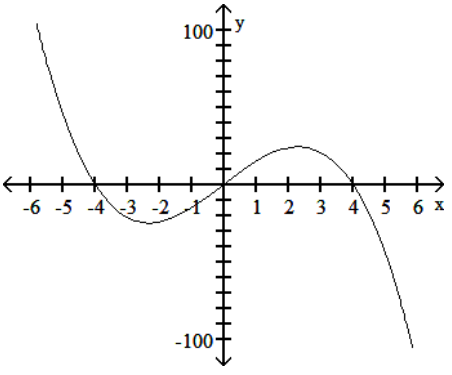
163) 163) _____



A) $f(x) = x^2 + 18x + 9$ B) $f(x) = -x^2 - 9x - 18$

C) $f(x) = x^2 + 18x - 9$ D) $f(x) = x^2 + 9x + 18$

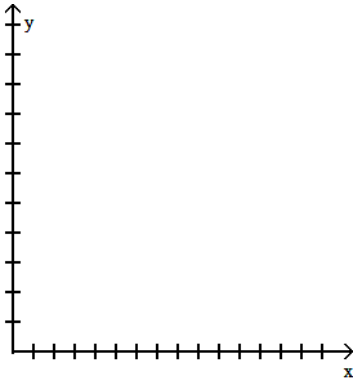
164) 164) _____



A) $f(x) = -x^3 + 16x$ B) $f(x) = x^3 + 16x$ C) $f(x) = -x^3 - 16x$ D) $f(x) = -x^3 - 16x$

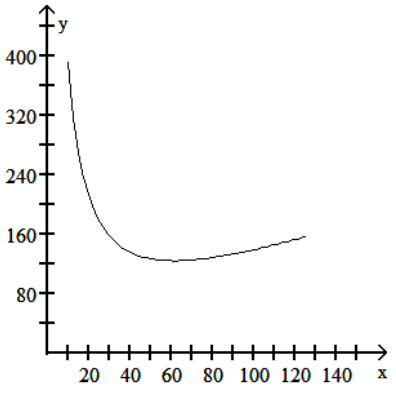
Solve the problem.

165) Financial analysts in a company that manufactures ovens arrived at the following daily cost equation for manufacturing x ovens per day: $C(x) = x^2 + 4x + 1800$. The average cost per unit at a production level of x ovens per day is $\overline{C}(x) = C(x)/x$. (i) Find the rational function $\overline{C}$. (ii) Sketch a graph of $\overline{C}(x)$ for $10 \le x \le 125$. (iii) For what daily production level (to the nearest integer) is the average cost per unit at a minimum, and what is the minimum average cost per oven (to the nearest cent)? HINT: Refer to the sketch in part (ii) and evaluate $\overline{C}(x)$ at appropriate integer values until a minimum value is found. 165) _____



A) (i) $\overline{C}(x) = \dfrac{x^2 + 4x + 1800}{x}$

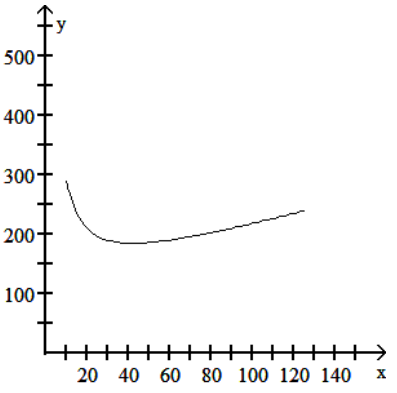
(ii)



(iii) 61 units; $133.29 per oven

B) (i) $\overline{C}(x) = \dfrac{x^2 + 4x + 1800}{x}$

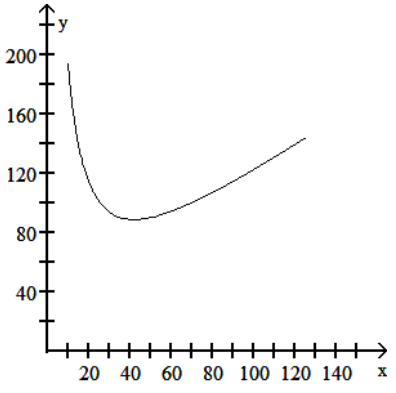
(ii)



(iii) 44 units; $185.61 per oven

C) (i) $\overline{C}(x) = \dfrac{x^2 + 4x + 1800}{x}$

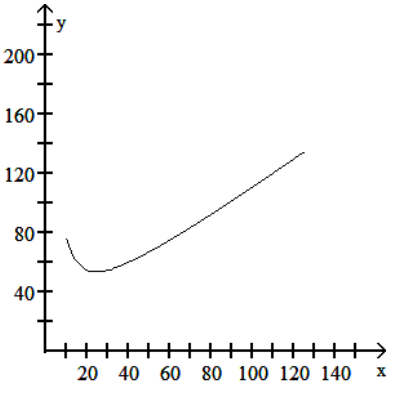
(ii)



(iii) 42 units; $88.86 per oven

D) (i) $\overline{C}(x) = \dfrac{x^2 + 4x + 1800}{x}$

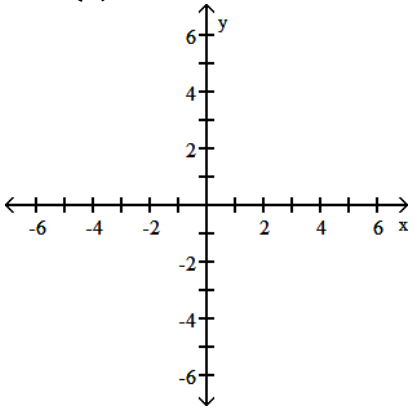
(ii)



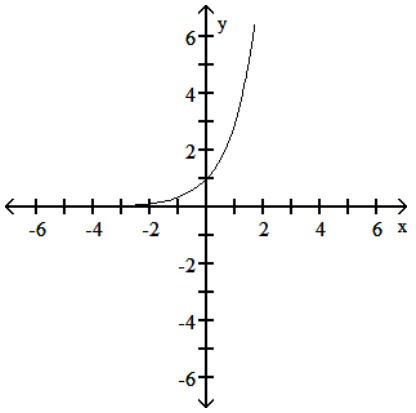
(iii) 22 units; $48.93 per oven

Graph the function.

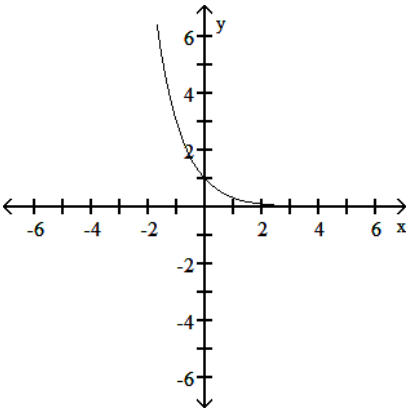
166) $f(x) = \left(\dfrac{1}{3}\right)^x$ 166) _____



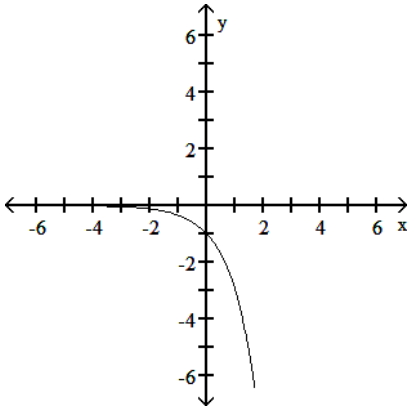
A)



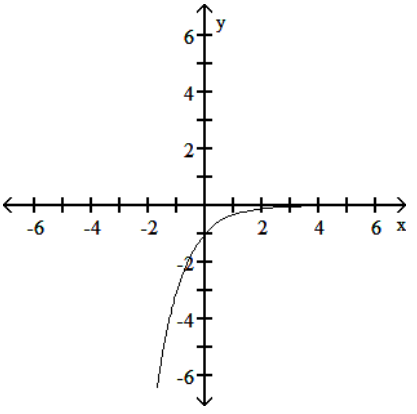
B)



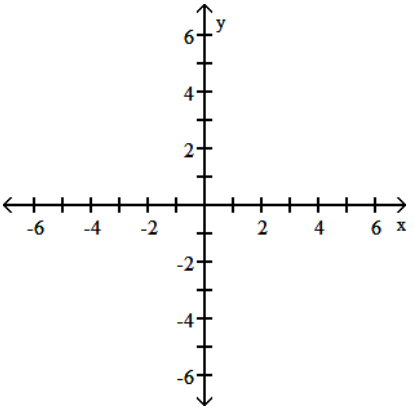
C)



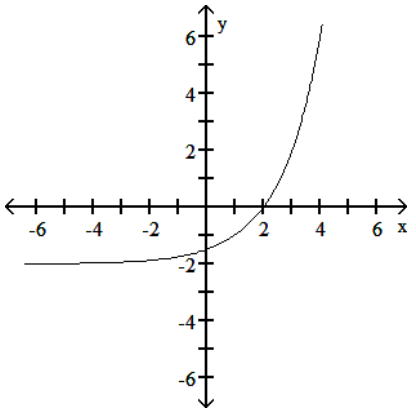
D)



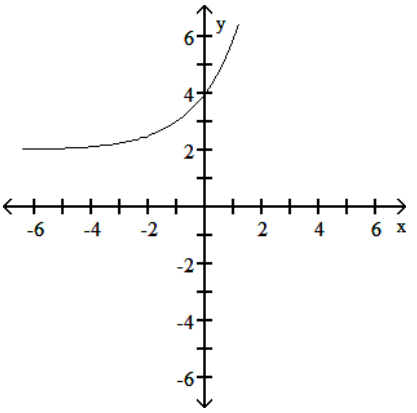
167) $f(x) = 2^{(x - 1)} - 2$ 167) _____



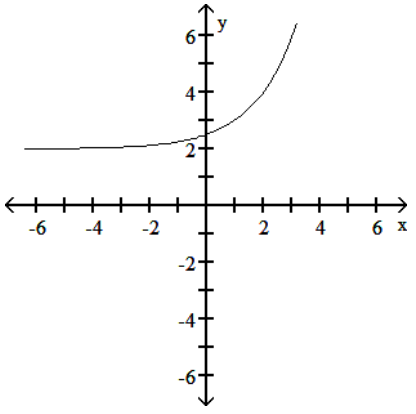
A)



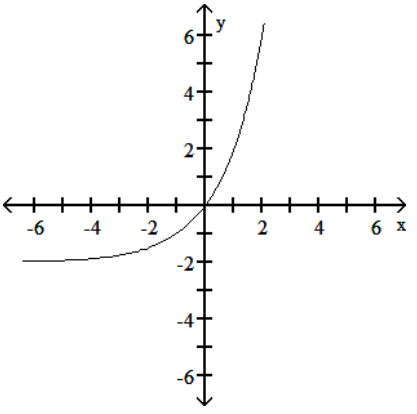
B)



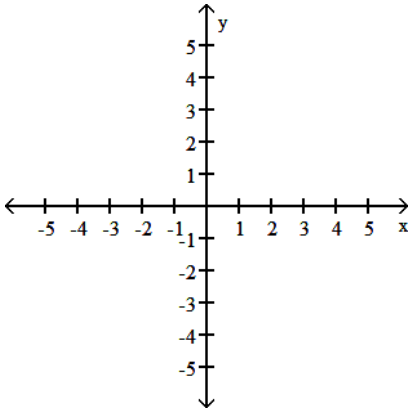
C)



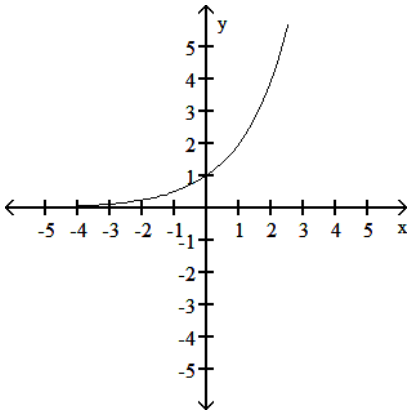
D)



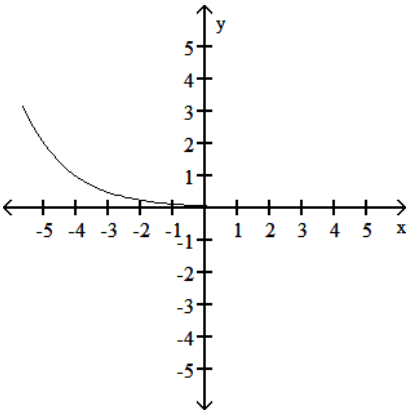
168) $f(x) = 2^{-x} - 4$ 168) _____



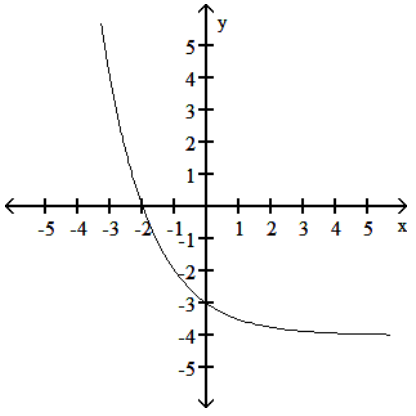
A)



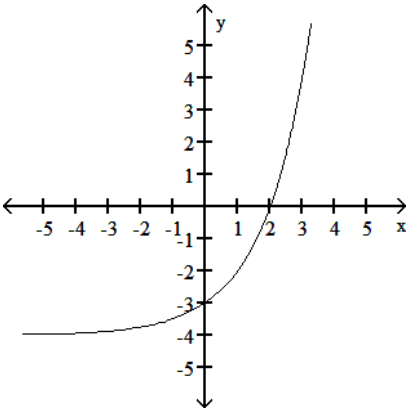
B)



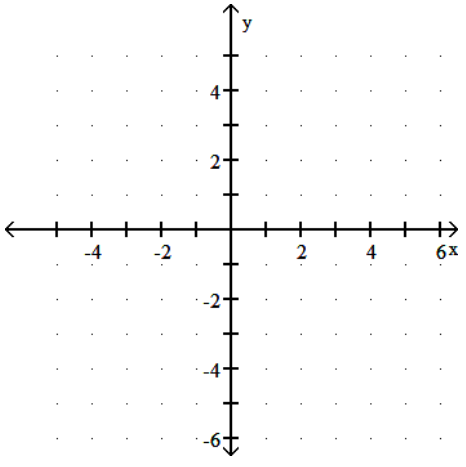
C)



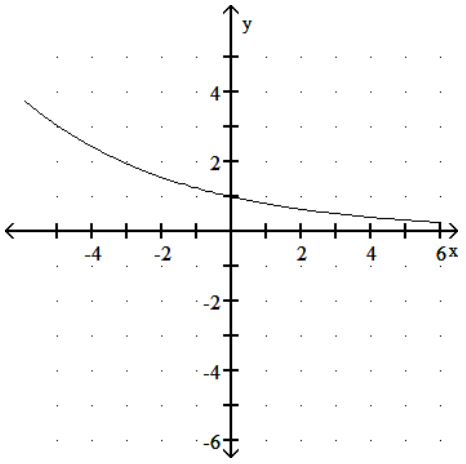
D)



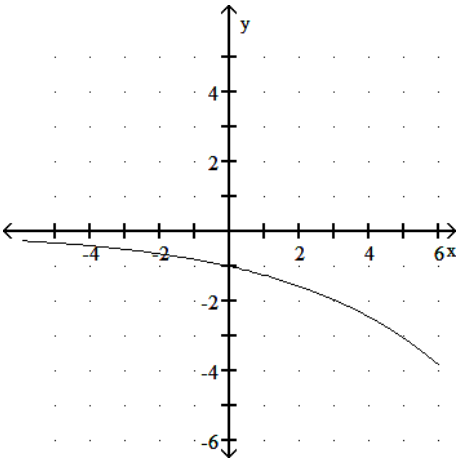
169) $f(x) = 0.8^x$ 169) _____



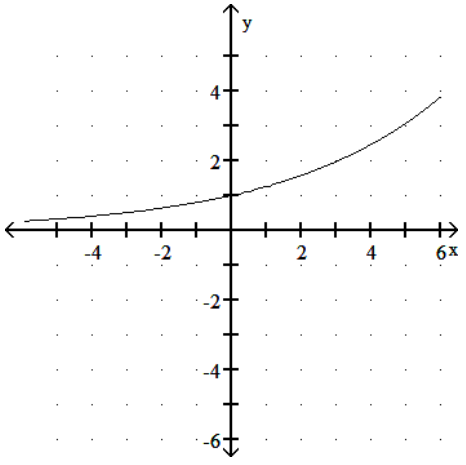
A)



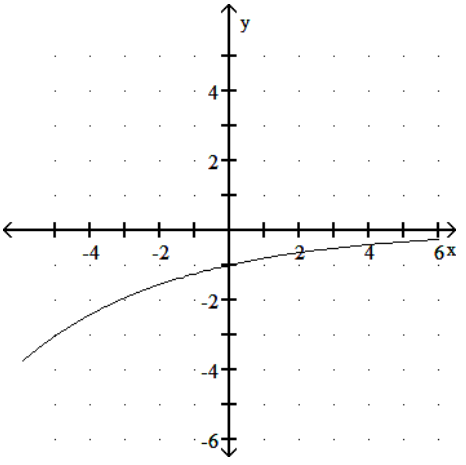
B)



C)

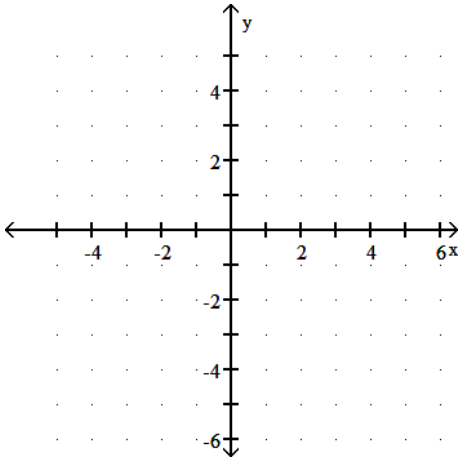


D)

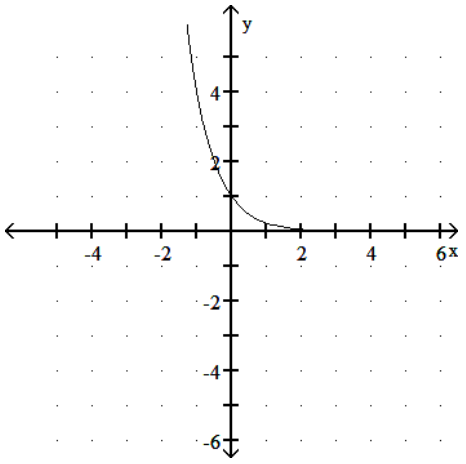


170) $f(x) = 4^x$

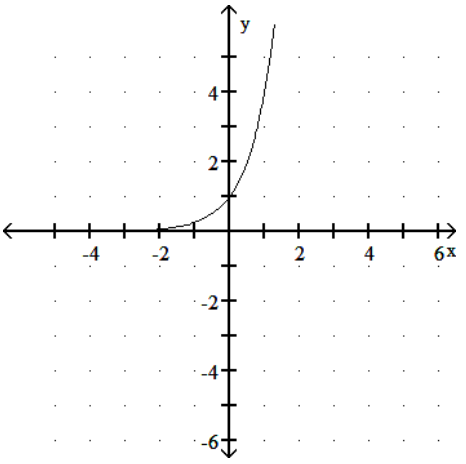
170) _____



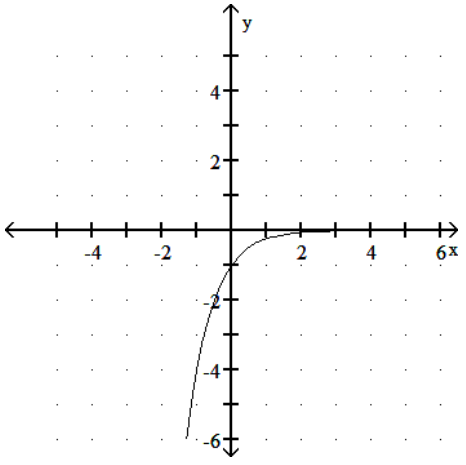
A)



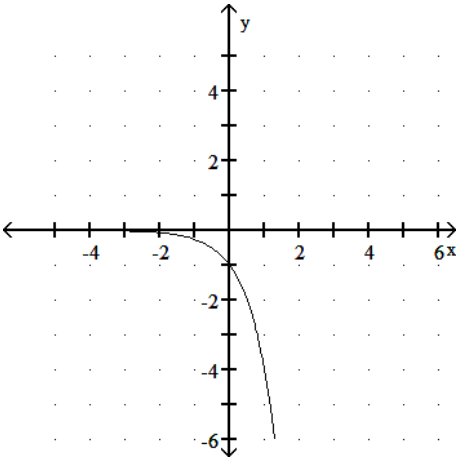
B)



C)



D)



Solve the equation.

171) Solve for x: $3^{(1 + 2x)} = 27$ 171) _____

A) -1 B) 3 C) 1 D) 9

172) Solve for x: $2^{4x} = 8^{x + 5}$ 172) _____

A) 5 B) -5 C) 15 D) -15

173) Solve for x: $(e^x)^x \cdot e^{72} = e^{17x}$ 173) _____

A) {-8, -9} B) {8, 9} C) {9} D) {8}

174) Solve for t: $e^{-0.07t} = 0.05$ Round your answer to four decimal places. 174) _____

A) 44.321 B) -66.4815 C) -70.1312 D) 42.7962

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

Solve the problem.

175) In the table below, the amount of the U.S. minimum wage is listed for selected years. 175) _____

U.S. Minimum Wage

Year	1961	1967	1974	1980	1981	1990	1991	1996	1997
Wage	$1.15	$1.40	$2.00	$3.10	$3.35	$3.80	$4.25	$4.75	$5.15

Find an exponential regression model of the form $y = a \cdot b^x$, where y represents the U.S. minimum wage x years after 1960. Round a and b to four decimal places. According to this model, what will the minimum wage be in 2005? In 2010?

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

176) Hi-Tech UnWater begins a cable TV advertising campaign in Miami to market a new water. The percentage of the target market that buys water is estimated by the function $w(t) = 100(1 - e^{-0.02t})$, t represents the number of days of the campaign. After how long will 90% of the target market have bought the water? 176) _____

A) 90 days B) 3 days C) 120 days D) 115 days

177) The number of books in a community college library increases according to the function $B = 7200e^{0.03t}$, where t is measured in years. How many books will the library have after 8 year(s)? 177) _____

A) 7200 B) 10,275 C) 4462 D) 9153

178) Since life expectancy has increased in the last century, the number of Alzheimer's patients has increased dramatically. The number of patients in the United States reached 4 million in 2000. Using data collected since 2000, it has been found that the data can be modeled by the exponential function $y = 4.19549 \cdot (1.02531)^x$, where x is the years since 2000. Estimate the Alzheimer's patients in 2025. Round to the nearest tenth. 178) _____

A) 7.8 million B) 8.0 million C) 4.8 million D) 3.9 million

179) A sample of 800 grams of radioactive substance decays according to the function $A(t) = 800e^{-0.028t}$, where t is the time in years. How much of the substance will be left in the sample after 10 years? Round to the nearest whole gram. 179) _____

A) 605 grams B) 800 grams C) 1 gram D) 9 grams

180) The number of reports of a certain virus has increased exponentially since 1960. The current number of cases can be approximated using the function $r(t) = 207\ e^{0.005t}$, where t is the number of years since 1960. Estimate the of cases in the year 2010. 180) _____

A) 190 B) 266 C) 240 D) 207

181) An initial investment of $12,000 is invested for 2 years in an account that earns 4% interest, compounded quarterly. Find the amount of money in the account at the end of the period. 181) _____

A) $12,994.28 B) $12,865.62 C) $994.28 D) $12,979.20

182) Suppose that $2200 is invested at 3% interest, compounded semiannually. Find the function for the amount of money after t years. 182) _____

A) $A = 2200\ (1.015)^{t}$
B) $A = 2200\ (1.0125)^{2t}$
C) $A = 2200\ (1.03)^{2t}$
D) $A = 2200\ (1.015)^{2t}$

Use the REGRESSION feature on a graphing calculator.

183) A strain of E-coli Beu-recA441 is placed into a petri dish at 30 °Celsius and allowed to grow. The following data are collected. Theory states that the number of bacteria in the petri dish will initially grow according to the law of uninhibited growth. The population is measured using an optical device in which the amount of light that passes through the petri dish is measured. 183) _____

Time in hours , x	Population, y
0	0.09
2.5	0.18
3.5	0.26
4.5	0.35
6	0.50

Find the exponential equation in the form $y = a \cdot b^{x}$, where x is the hours of growth. Round to four decimal places.

A) $y = 1.3384 \cdot 0.0903^{x}$
B) $y = 0.0903 \cdot 1.3384^{x}$
C) $y = 1.3384^{x}$
D) $y = 0.0903^{x}$

184) The total cost of the Democratic and the Republican national conventions has increased 596% over the 20-year period between 1980 and 2004. The following table lists the total cost, in millions of dollars, for selected years. 184) _____

Year, x	Cost, y
1980, x = 0	$ 23.1
1984, x = 4	31.8
1988, x = 8	44.4
1992, x = 12	58.8
1996, x = 16	90.6
2000, x = 20	160.8
2004, x = 24	170.5

Find the exponential functions that best estimates this data. Round your answer to four decimal places

A) $y = 1.0929 \cdot (22.2887)^{x}$
B) $y = 22.2887x \cdot (1.0929)^{x}$
C) $y = 22.2887 \cdot (1.0929)^{x}$
D) $y = 6.6643x + 2.8857$

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

185) A particular bacterium is found to have a doubling time of 20 minutes. If a laboratory culture begins with a population of 300 of this bacteria and there is no change in the growth rate, how many bacteria will be present in 55 minutes? Use six decimal places in the interim calculation for the growth rate. 185) _____

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

Convert to a logarithmic equation.

186) $2^3 = 8$ 186) _____

A) $\log_3 8 = 2$ B) $\log_2 3 = 8$ C) $\log_8 2 = 3$ D) $\log_2 8 = 3$

187) $5^2 = 25$ 187) _____

A) $25 = \log_5 2$ B) $2 = \log_{25} 5$ C) $5 = \log_2 25$ D) $2 = \log_5 25$

188) $10^{0.4771} = 3$ 188) _____

A) $0.4771 = \log 3$ B) $0.4771 = \log_9 10$

C) $0.4771 = \log 10$ D) $3 = \log 0.4771$

189) $e^t = 7$ 189) _____

A) $\log_7 e = t$ B) $\ln 7 = t$ C) $\log_7 t = e$ D) $\ln t = 7$

Convert to an exponential equation.

190) $\log_9 27 = \frac{3}{2}$ 190) _____

A) $27 = \left(\frac{3}{2}\right)^9$ B) $9 = 27^{3/2}$ C) $27 = 9^{3/2}$ D) $\frac{3}{2} = \sqrt[9]{27}$

191) $\log_8 512 = t$ 191) _____

A) $8^t = 512$ B) $8^{512} = t$ C) $t^8 = 512$ D) $512^8 = t$

192) $\ln 44 = 3.7842$ 192) _____

A) $e^{3.7842} = \ln 44$ B) $e^{3.7842} = 44$ C) $e^{44} = 3.7842$ D) $e^{3.7842} = 1$

Evaluate.

193) $\log_8 8^4$ 193) _____

A) 4 B) 8^4 C) 8 D) 32

Use a calculator to evaluate the expression. Round the result to five decimal places.

194) $\log 0.17$ 194) _____

A) -1.76955 B) -0.76955 C) -4.07454 D) -1.77196

195) $\log 0.234$ 195) _____

A) 0.234 B) -1.45243 C) -0.63074 D) 1.26364

196) $\log 51.237$ 196) _____

A) 51.237 B) 1.70958 C) 3.93646 D) Undefined

197) $\log (-10.25)$ 197) _____

A) 2.32728 B) -1.01072 C) 1.01072 D) Undefined

198) $\log_8 36.8$ 198) _____

A) 1.56585 B) 1.73388 C) 0.57674 D) 3.60550

199) ln 0.027 199) _____

A) 0.56864 B) -1.56864 C) -3.61192 D) Undefined

200) ln 1097 200) _____

A) 3.04021 B) 9.30292 C) 4.69775 D) 7.00033

Write in terms of simpler forms.

201) $\log_8 XY$ 201) _____

A) $\log_4 X + \log_4 Y$ B) $\log_8 X + \log_8 Y$ C) $\log_8 X - \log_8 Y$ D) $\log_4 X - \log_4 Y$

202) $\log_b \frac{x}{b}$ 202) _____

A) $\log_b x + \log_b b$ B) $\log_b x - b$ C) $\log_{2b} \frac{x}{b}$ D) $\log_b x - \log_b b$

203) $\log_b M^9$ 203) _____

A) $M \log_b 9$ B) $9 + \log_b M$ C) $M + \log_b 9$ D) $9 \log_b M$

204) $4^{a \log_4 b}$ 204) _____

A) b^{4a} B) b^a C) a^b D) a^{4b}

Solve for x to two decimal places (using a calculator).

205) $700 = 500(1.04)^x$ 205) _____

A) 520 B) 8.58 C) 1.40 D) 1.35

206) $5.2 = 1.006^{12x}$ 206) _____

A) 1.07 B) 5.17 C) 2.32 D) 22.97

Use the properties of logarithms to solve.

207) $\log_7 x + \log_7(x - 2) = \log_7 24$ 207) _____

A) 2 B) 24 C) 6 D) 7

208) $\log_b x - \log_b 5 = \log_b 2 - \log_b(x - 3)$ 208) _____

A) 2 B) 2, 5 C) 5 D) 3

209) $\log_b(x + 3) + \log_b x = \log_b 54$ 209) _____

A) 3 B) -6 C) 6 D) -6, -3

210) $\log_6 (4x - 5) = 1$ 210) _____

A) $\frac{\log 5}{4}$ B) $\frac{11}{4}$ C) 7 D) $\frac{11}{6}$

211) $\ln(3x - 4) = \ln 20 - \ln(x - 5)$ 211) _____

A) $0, \frac{19}{3}$ B) $\frac{19}{3}$ C) $5, \frac{5}{3}$ D) $-5, -\frac{19}{3}$

212) $\log(x + 10) - \log(x + 4) = \log x$ 212) _____

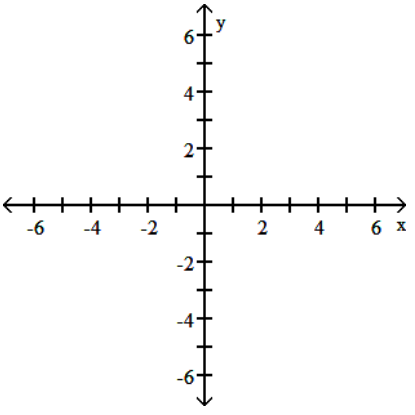
A) 6 B) -5 C) 2 D) 2, - 5

213) $\log(x - 9) = 1 - \log x$ 213) _____

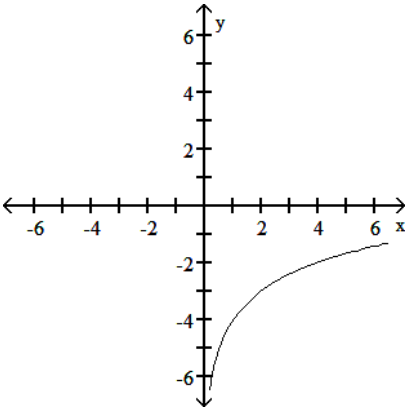
A) -1, 10 B) 10 C) -10, 1 D) -10

Graph by converting to exponential form first.

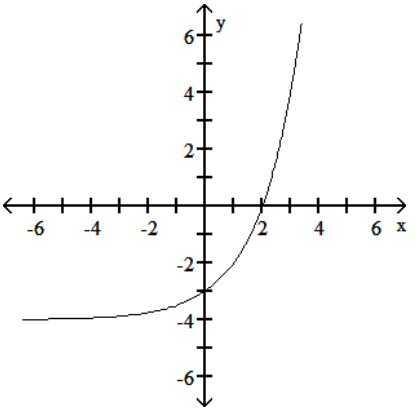
214) $y = \log_2(x - 4)$ 214) _____



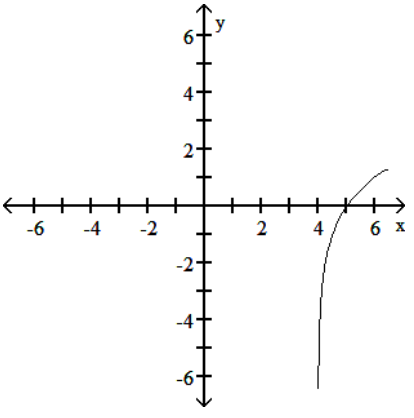
A)



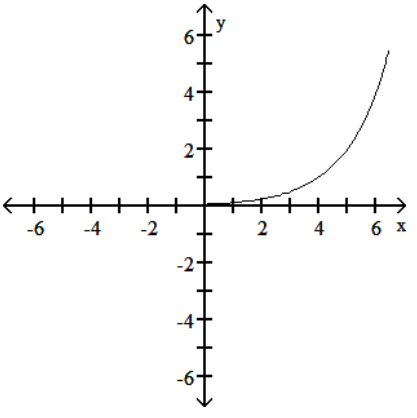
B)



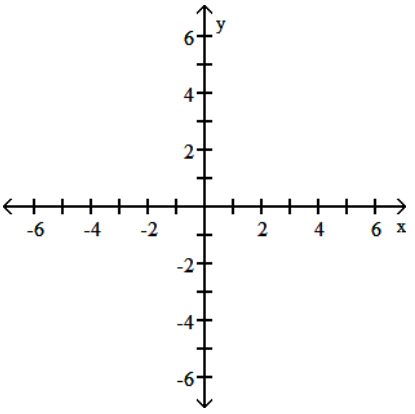
C)



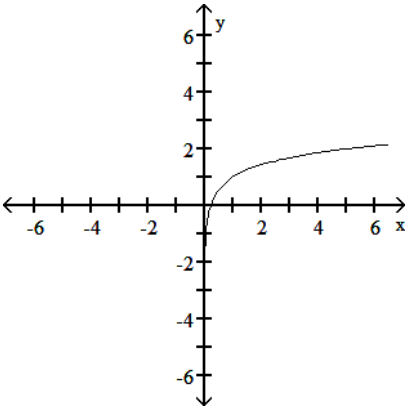
D)



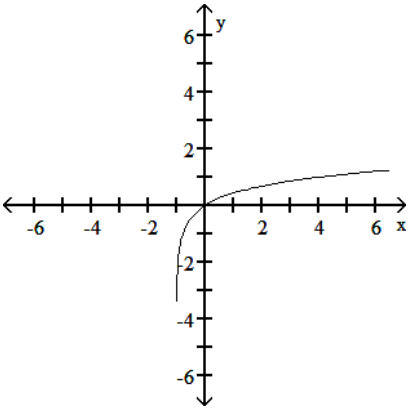
215) $y = \log_5 (x + 1)$ 215) _____



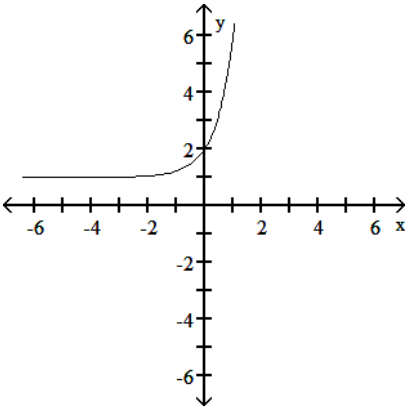
A)



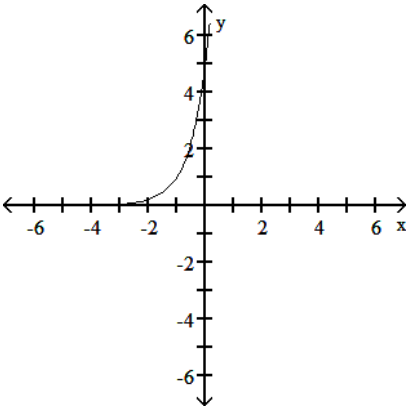
B)



C)

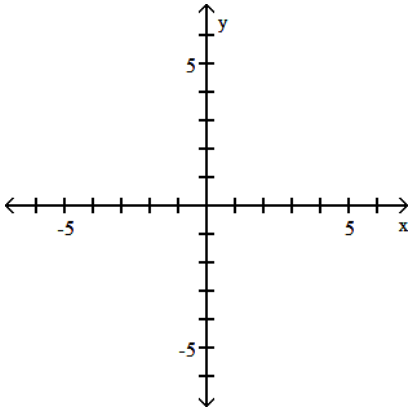


D)

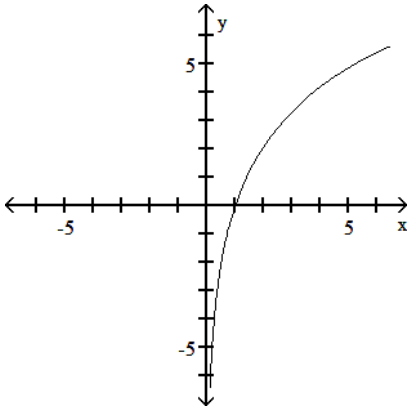


Graph the function using a calculator and point-by-point plotting. Indicate increasing and decreasing intervals.

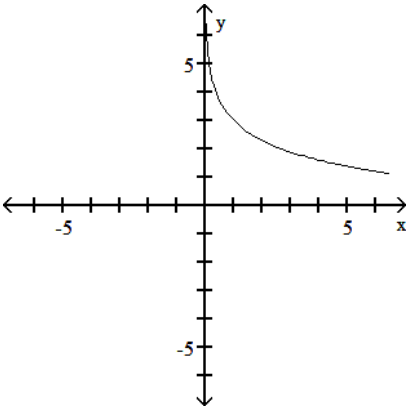
216) f(x) = 3 ln x 216) _____



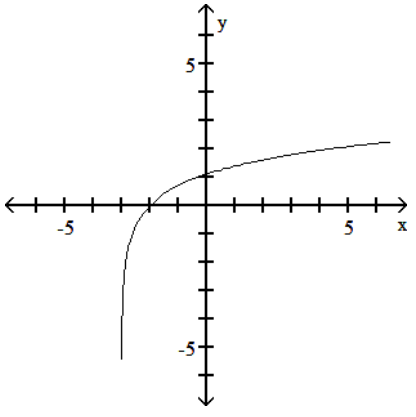
A) Increasing: (0, ∞)



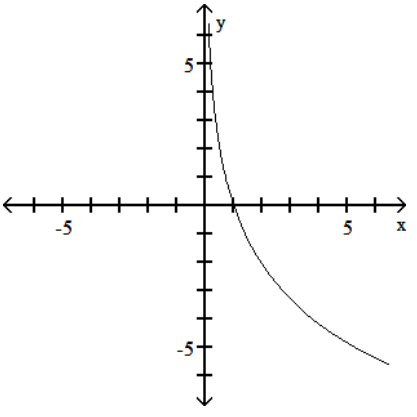
B) Decreasing: (0, ∞)



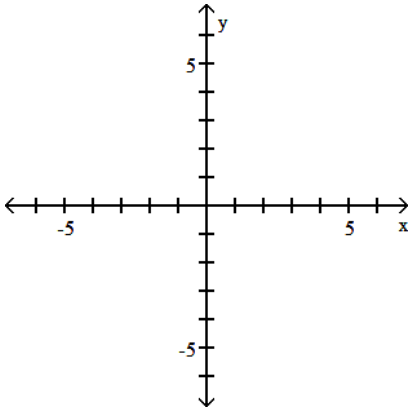
C) Increasing: (-3, ∞)



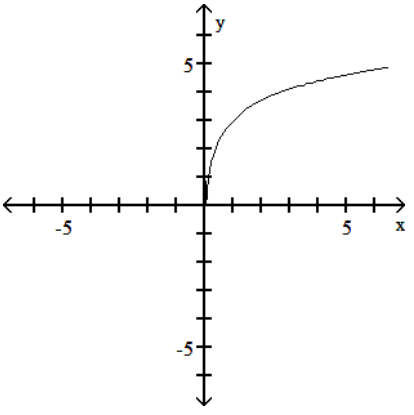
D) Decreasing: (0, ∞)



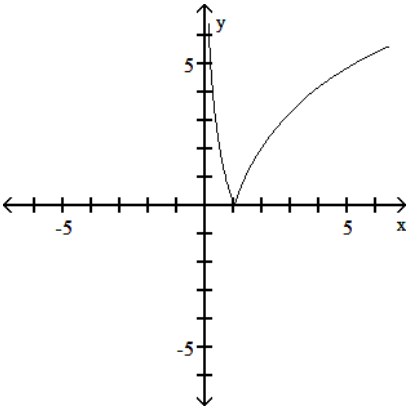
217) $f(x) = |-3 \ln x|$ 217) _____



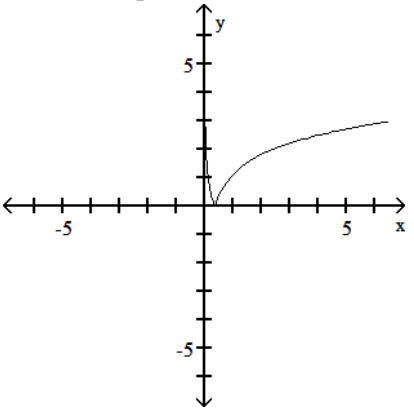
A) Decreasing: $(0, \infty)$



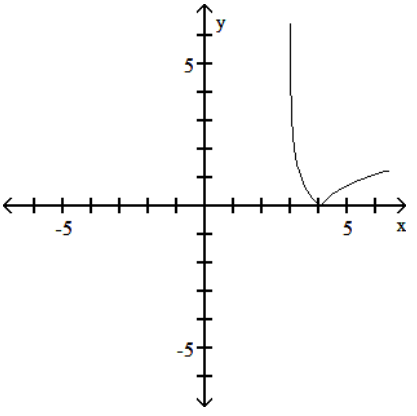
B) Decreasing: $(0, 1]$
Increasing: $[1, \infty)$



C) Decreasing: $\left(0, \frac{1}{2}\right]$
Increasing: $\left[\frac{1}{2}, \infty\right)$

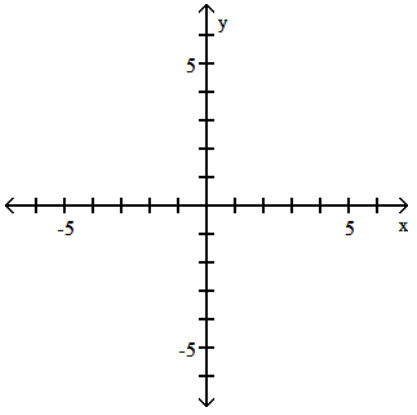


D) Decreasing: $(0, -3]$
Increasing: $[-3, \infty)$

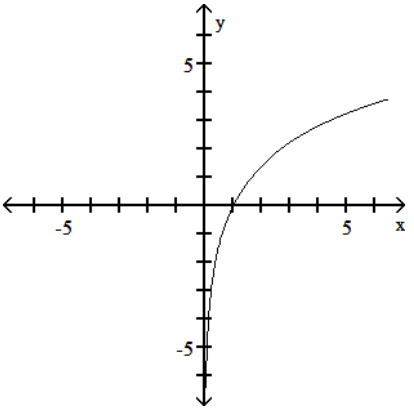


218) f(x) = 2 - ln x

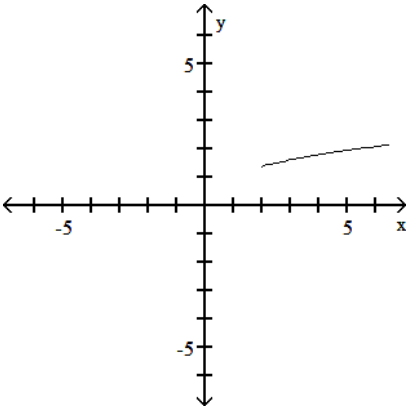
218) _____



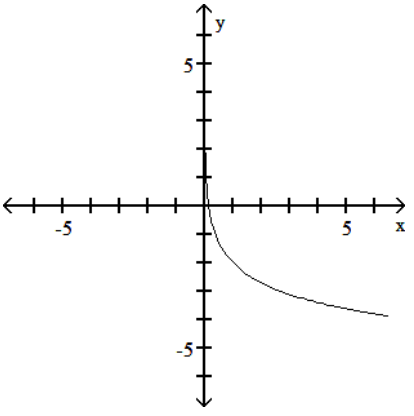
A) Increasing (0, ∞)



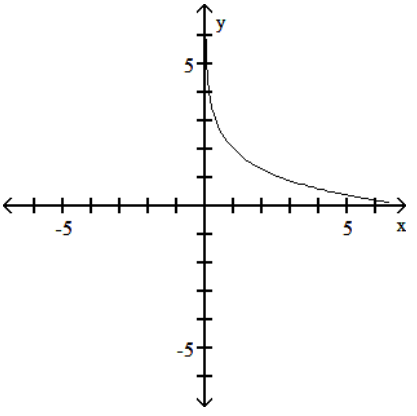
B) Increasing (2, ∞)



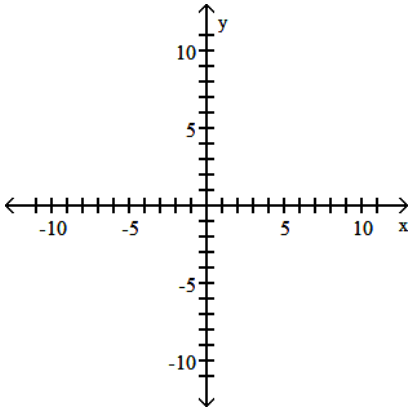
C) Decreasing: (0, ∞)



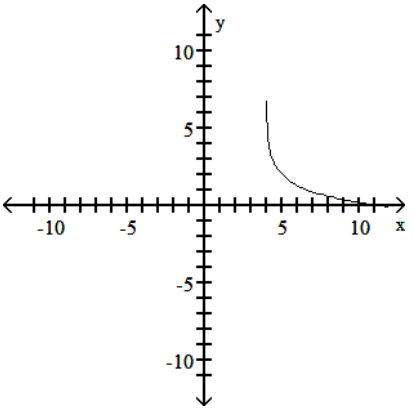
D) Decreasing: (0, ∞)



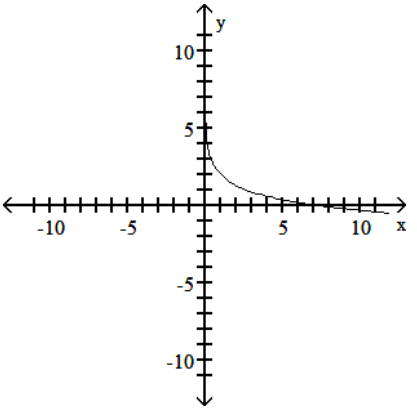
219) $f(x) = 2 - \ln(x + 4)$ 219) _____



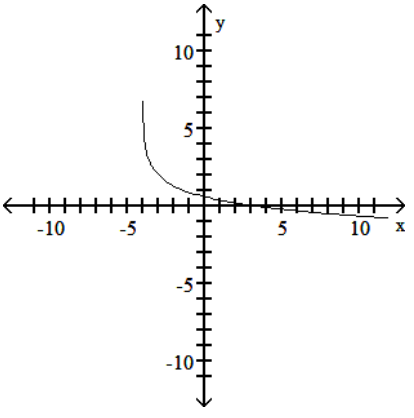
A) Decreasing: $(4, \infty)$



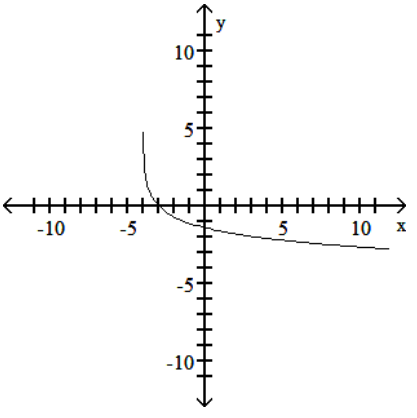
B) Decreasing: $(0, \infty)$



C) Decreasing: $(-4, \infty)$



D) Decreasing: $(-4, \infty)$



Solve the problem.

220) If \$1250 is invested at a rate of $8\frac{1}{4}\%$ compounded monthly, what is the balance after 10 years? 220) _____

$[A = P(1 + i)^n]$

A) \$1594.31 B) \$1031.25 C) \$2844.31 D) \$2281.25

221) If \$4,000 is invested at 7% compounded annually, how long will it take for it to grow to \$6,000, assuming no withdrawals are made? Compute answer to the next higher year if not exact. 221) _____

$[A = P(1 + r)^t]$

A) 5 years B) 8 years C) 2 years D) 6 years

222) In North America, coyotes are one of the few species with an expanding range. The future population of coyotes in a region of Mississippi valley can be modeled by the equation $P = 59 + 12 \cdot \ln(18t + 1)$, where t is time in years. Use the equation to determine when the population will reach 170. (Round your answer to the nearest tenth year.) 222) _____

A) 581.3 years B) 583.1 years C) 586.2 years D) 578.0 years

223) A country has a population growth rate of 2.4% compounded continuously. At this rate, how long will it take for the population of the country to double? Round your answer to the nearest tenth. 223) _____

A) 2.9 years B) 30 years C) .29 years D) 28.9 years

224) A carbon-14 dating test is performed on a fossil bone, and analysis finds that 15.5% of the original amount of carbon-14 is still present in the bone. Estimate the age of the fossil bone. (Recall that carbon-14 decays according to the equation $A = A_0e^{-0.000124t}$). 224) _____

A) 150 years B) 15,035 years C) 15,000 years D) 1,500 years

225) Assume that a savings account earns interest at the rate of 2% compounded monthly. If this account contains $1000 now, how many months will it take for this amount to double if no withdrawals are made? 225) _____

A) 417 months B) 12 months C) 408 months D) 450 months

226) U. S. Census Bureau data shows that the number of families in the United States (in millions) in year x is given by $h(x) = 51.42 + 15.473 \cdot \log x$, where $x = 0$ is 1980. How many families were there in 2002? 226) _____

A) 21 million B) 72 million C) 90 million D) 48 million

227) The level of a sound in decibels (db) is determined by the formula $N = 10 \cdot \log(I \times 10^{12})$ db, where I is the intensity of the sound in watts per square meter. A certain noise has an intensity of 8.49×10^{-4} watts per square meter. What is the sound level of this noise? (Round your answer to the nearest decibel.) 227) _____

A) 206 db B) 9 db C) 79 db D) 89 db

228) Book sales on the Internet (in billions of dollars) in year x are approximated by $f(x) = 1.84 + 2.1 \cdot \ln x$, where $x = 0$ corresponds to 2000. How much will be spent on Internet book sales in 2008? Round to the nearest tenth. 228) _____

A) 6.2 billion B) 6.0 billion C) 8.0 billion D) 3.9 billion

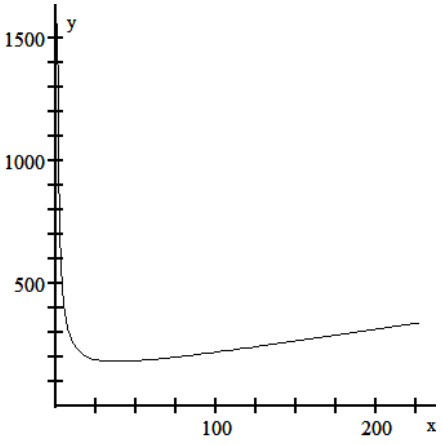
1) A
2) D
3) B
4) A
5) B
6) A
7) C
8) C
9) B
10) A
11) C
12) B
13) B
14) B
15) C
16) A
17) C
18) C
19) $-27, -12, -\frac{33}{2}$
20) 53
21) -5
22) D
23) D
24) B
25) B
26) A
27) $f(x) = \frac{2x}{48 - x}$ has domain all real numbers except $x = 48$.
28) B
29) A
30) A
31) A
32) B
33) B
34) B
35) C
36) B
37) D
38) A
39) C
40) C
41) Choice (A) defines a function. To each element (student) of the first set (or domain), there corresponds exactly one element (teacher) of the second set (or range).
Choice (B) does not define a function. An element (student) of the first set (or domain) corresponds to more that one element (teacher) of the second set (or range).
42) D
43) C
44) B

45) D
46) B
47) C
48) D
49) C
50) D
51) Basic function is $f(x) = x^2$; shift right 2 units, shift up 5 units. $f(x) = (x - 2)^2 + 5$
52) Basic function is $f(x) = |x|$; reflect over the x -axis, shift left 4 units, shift down 2 units. $f(x) = -|x + 4| - 2$
53) D
54) D
55) D
56) $g(x) = \begin{cases} x - 9 & x < 7 \\ (x - 5)^2 - 1 & x \geq 7 \end{cases}$
57) A
58) A
59) C
60) B
61) A
62) D
63) B
64) A
65) B
66) B
67) A
68) B
69) A
70) C
71) B
72) C
73) A
74) A
75) B
76) D
77) D
78) A
79) B
80) D
81) B
82) D
83) D
84) D
85) C
86) D
87) D
88) $f(x) = -(x + 2)^2 + 9$; vertex: (-2, 9); maximum: $f(-2) = 9$; Range of $f = \{y | y \leq 9\}$; y-intercept: (0, 5); x-intercepts: (-5, 0), (1, 0).
89) C
90) D
91) C

92) C
93) A
94) A
95) B
96) D
97) B
98) B
99) B
100) C
101) B
102) C
103) A
104) B
105) B
106) B
107) D
108) C
109) C
110) D
111) B
112) A
113) C
114) D
115) C
116) D
117) D
118) A
119) B
120) A
121) C
122) A
123) B
124) A
125) C
126) B
127) D
128) B
129) C
130) C
131) B
132) $P(x) = -6x^2 + 80.3x - 150$, must sell approximately 6.69 million cameras.

133) (A) $\overline{C}(x) = \frac{1500}{x} + 105 + x$

(B)



(C) 39; $182.46

134) D
135) A
136) D
137) C
138) A
139) D
140) D
141) D
142) D
143) A
144) D
145) B
146) C
147) B
148) C
149) A
150) B
151) A
152) A
153) D
154) D
155) C
156) B
157) A
158) D
159) C
160) A
161) D
162) A
163) B
164) A
165) C

166) B
167) A
168) C
169) A
170) B
171) C
172) C
173) B
174) D
175) $y = 1.1389(1.0429^x)$; $7.54; $9.30
176) D
177) D
178) A
179) A
180) B
181) A
182) D
183) B
184) C
185) 2,018 bacteria
186) D
187) D
188) A
189) D
190) C
191) A
192) B
193) A
194) B
195) C
196) B
197) D
198) B
199) C
200) D
201) B
202) D
203) D
204) B
205) B
206) D
207) C
208) C
209) C
210) B
211) B
212) C
213) B
214) C
215) B

216) A
217) B
218) D
219) C
220) C
221) D
222) D
223) D
224) B
225) A
226) B
227) D
228) A