College Algebra (Math 1023) Practice Final

Name_____

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

List all the elements of B that belong to the given set.

1) $B = \{3, \sqrt{6}, -11, 0, \frac{0}{2}, , 0.59, -6\pi, 0.444...\}$ 1) _____

   Irrational numbers

   A) $\{\sqrt{6}\}$ B) $\{\sqrt{6}, -6\pi, 0.444...\}$

   C) $\left\{\sqrt{6}, \frac{0}{2}, -6\pi\right\}$ D) $\{\sqrt{6}, -6\pi\}$

Find the midpoint of the line segment joining the points P_1 and P_2.

2) $P_1 = (5a, 9)$; $P_2 = (6a, 4)$ 2) _____

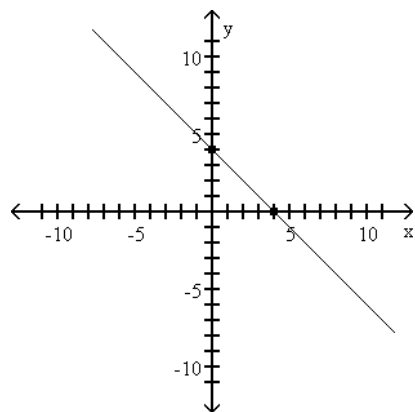   A) $(a, 5)$ B) $(11a, 13)$ C) $\left(\frac{11a}{2}, \frac{13}{2}\right)$ D) $\left(\frac{13a}{2}, \frac{11}{2}\right)$

Find the slope of the line.
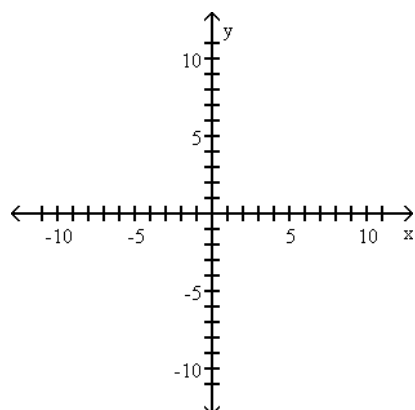
3)   3) _____

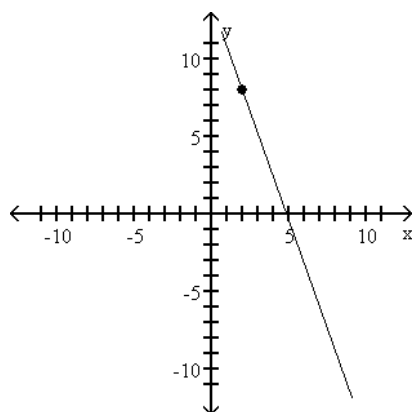   A) -1   B) 1   C) -4   D) 4

Graph the line containing the point P and having slope m.
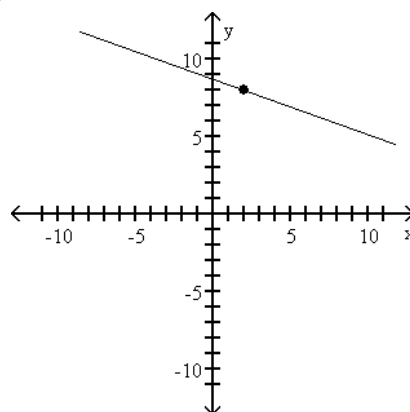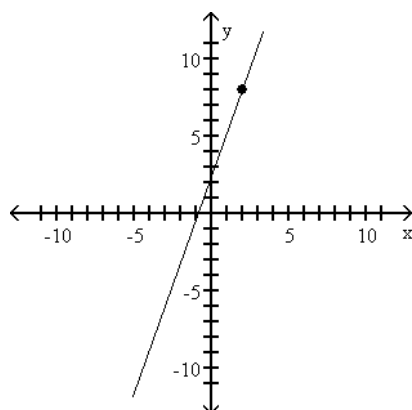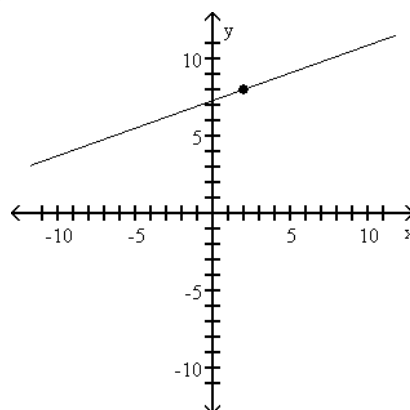
1

4) $P = (2, 8)$; $m = -\dfrac{14}{5}$

A)

B)

C)

D)

Find an equation for the line with the given properties.

5) Slope undefined; containing the point $\left(-\dfrac{5}{8}, 6 \right)$

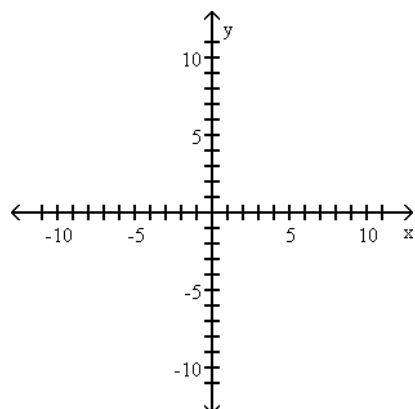A) $x = -\dfrac{5}{8}$ B) $x = 6$ C) $y = 6$ D) $y = -\dfrac{5}{8}$

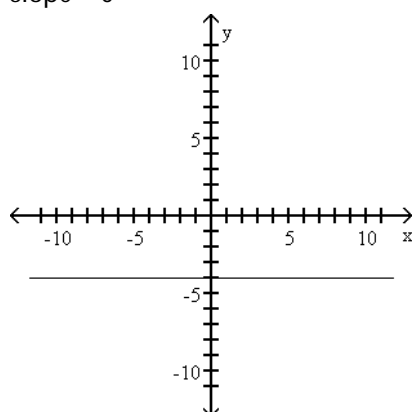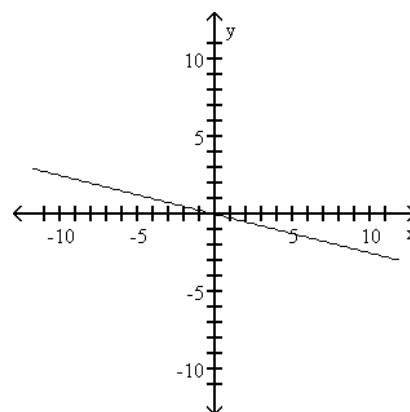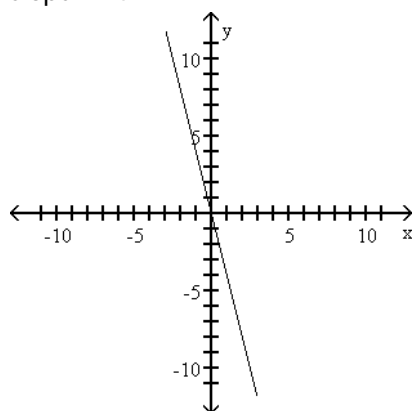Find the slope of the line and sketch its graph.
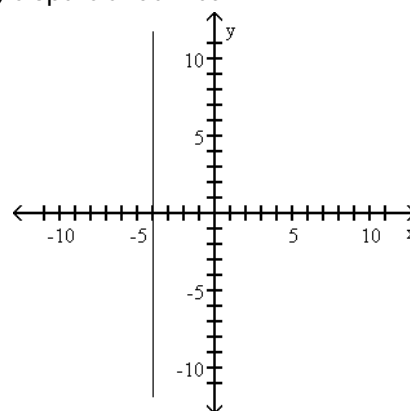
6) y + 4 = 0

6) _____

A) slope = 0

B) slope = $-\dfrac{1}{4}$

C) slope = -4

D) slope is undefined

Find an equation for the line, in the indicated form, with the given properties.

7) Containing the points (2, 0) and (0, -11);   general form

7) _____

A) $y = -\dfrac{11}{2}x - 11$ B) $11x - 2y = 22$ C) $11x + 2y = 22$ D) $y = -\dfrac{11}{2}x + 2$

Find the slope-intercept form of the equation of the line with the given properties.

    8) Slope = 0; containing the point (-10, -4)   8) _____

        A) x = -4   B) x = -10   C) y = -4   D) y = -10

Find the slope and y-intercept of the line.

    9) 7x - 9y = 63   9) _____

        A) slope = $-\dfrac{7}{9}$; y-intercept = 7   B) slope = $\dfrac{9}{7}$; y-intercept = 9

        C) slope = $\dfrac{7}{9}$; y-intercept = -7   D) slope = 7; y-intercept = 63

Solve the equation.

    10) -7x + 50 = -2x + 15   10) _____

        A) {-10}   B) {7}   C) {-7}   D) {10}

    11) $\dfrac{6x - 9}{2x - 8} = \dfrac{21x - 6}{7x + 7}$ 11) _____

        A) $\left\{-\dfrac{5}{53}\right\}$ B) $\left\{\dfrac{5}{67}\right\}$ C) $\left\{-\dfrac{37}{67}\right\}$ D) $\left\{\dfrac{37}{53}\right\}$

Solve the problem.

    12) It costs $35 per hour plus a flat fee of $26 for a plumber to make a house call. After writing an   12) _____
        equation for this situation, suppose the total cost to have a plumber come to a house is $271. How
        many hours did the plumber work?

        A) 12 hr   B) 2 hr   C) 17 hr   D) 7 hr

    13) Using a phone card to make a long distance call costs a flat fee of $0.71 plus $0.20 per minute   13) _____
        starting with the first minute. What is an equation of the form y = ax + b for this situation?

        A) y = 0.20x + 0.71   B) y = 0.71x + 0.20   C) y = 0.20x   D) y = 0.71x

Solve the equation by factoring.

    14) $5x^2 - 25 = 0$ 14) _____

        A) {12.5}   B) {6}   C) $\{-\sqrt{5}, \sqrt{5}\}$ D) {-5, 5}

What number should be added to complete the square of the expression?

    15) $x^2 - \dfrac{2}{3}x$ 15) _____

        A) $-\dfrac{1}{3}$ B) $\dfrac{1}{9}$ C) $\dfrac{4}{9}$ D) $-\dfrac{2}{9}$

Solve the equation by completing the square.

    16) $9x^2 + 18x + 8 = 0$ 16) _____

        A) $\left\{-\dfrac{2}{9}, -\dfrac{4}{9}\right\}$ B) $\left\{-\dfrac{2}{3}, -\dfrac{4}{3}\right\}$ C) $\left\{\dfrac{2}{3}, \dfrac{4}{3}\right\}$ D) $\left\{-\dfrac{4}{3}, \dfrac{4}{3}\right\}$

Find the real solutions, if any, of the equation. Use the quadratic formula and a calculator. Express any solutions rounded to two decimal places. Use 3.14 to approximate π.

17) $\pi x^2 + \pi x - 4 = 0$ 17) _____

    A) {-1.73, 0.73}   B) {-0.73, 1.73}   C) {-1.73, -0.73}   D) {0.73, 1.73}

Solve the problem.

18) The area of a circle is found by the equation $A = \pi r^2$. If the area A of a certain circle is 64π square   18) _____
centimeters, find its radius r.

    A) 8π cm   B) $8\sqrt{\pi}$ cm   C) {8 cm, -8 cm}   D) 8 cm

Write the expression in the standard form a + bi.

19) i^{16} 19) _____

    A) i   B) -i   C) -1   D) 1

Fill in the blank with the correct inequality symbol.

20) If x < -10, then x + 10 ____ 0.   20) _____

    A) <   B) ≥   C) >   D) ≤

Find an equation for the line with the given properties.

21) Parallel to the line 2x + 9y = 24; containing the point (3, -6)   21) _____

    A) 3x + 9y = 24   B) 9x + 2y = -6   C) 2x + 9y = -48   D) 2x - 9y = -48
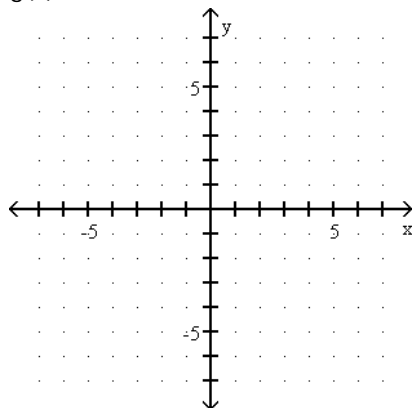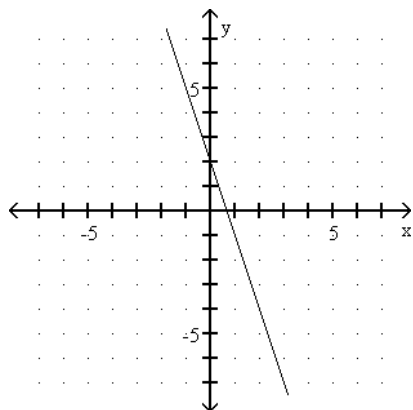
Use the slope and y-intercept to graph the linear function.

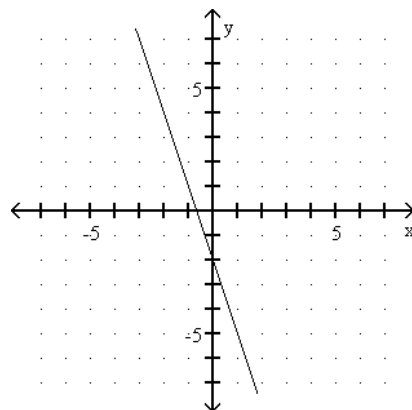22) g(x) = -3x + 2   22) _____
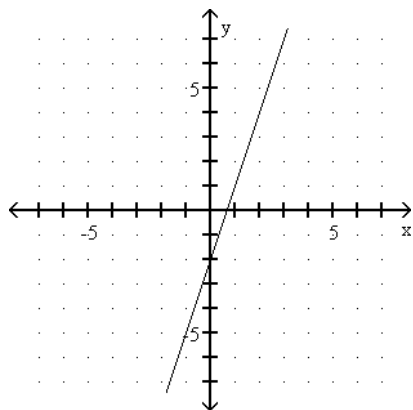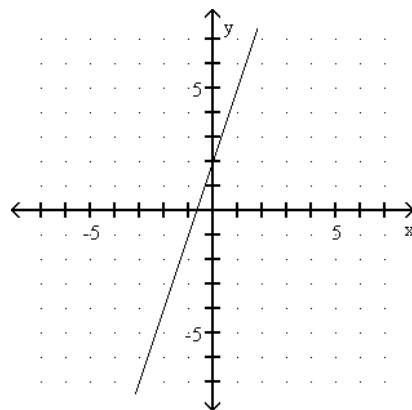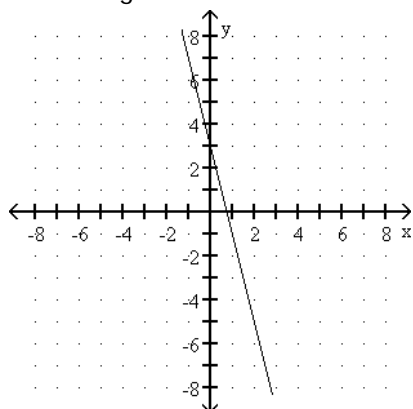
A)

B)

C)

D)

6

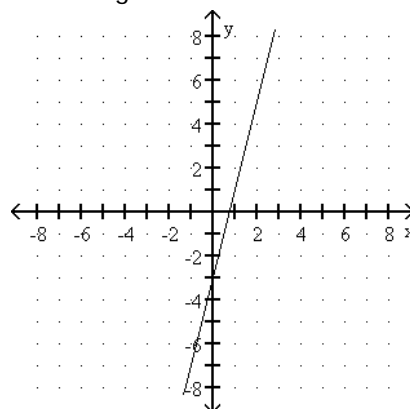Graph the function. State whether it is increasing, decreasing, or constant..

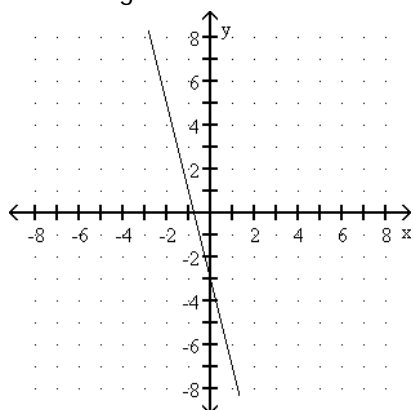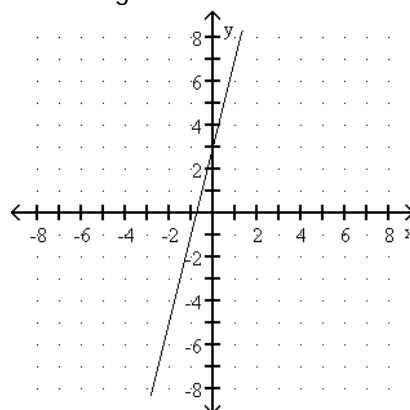23) $h(x) = -4x - 3$

A) decreasing

B) increasing

C) decreasing

D) increasing

Solve the problem.

24) To convert a temperature from degrees Celsius to degrees Fahrenheit, you multiply the temperature in degrees Celsius by 1.8 and then add 32 to the result. Express F as a linear function of c.

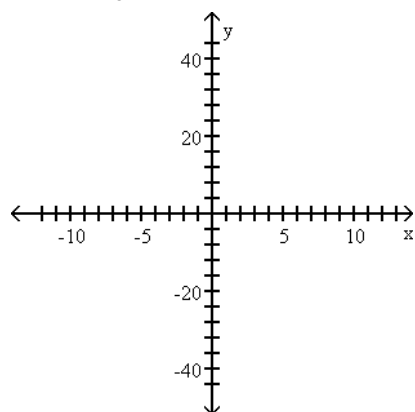   A) $F(c) = 33.8c$ B) $F(c) = \dfrac{c - 32}{1.8}$ C) $F(c) = 1.8 + 32c$ D) $F(c) = 1.8c + 32$
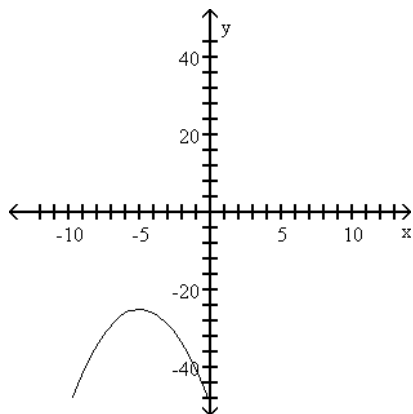
Graph the function f by starting with the graph of $y = x^2$ and using transformations (shifting, compressing, stretching, and/or reflection).
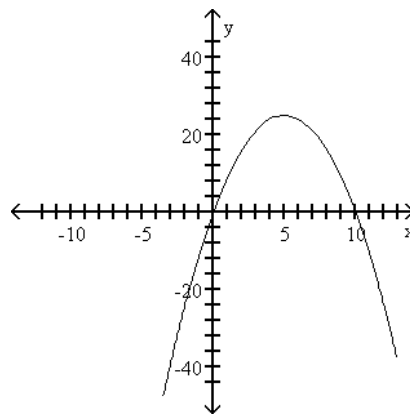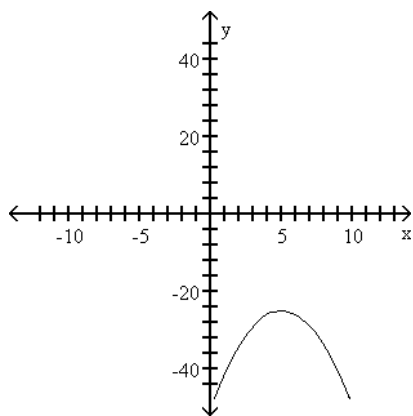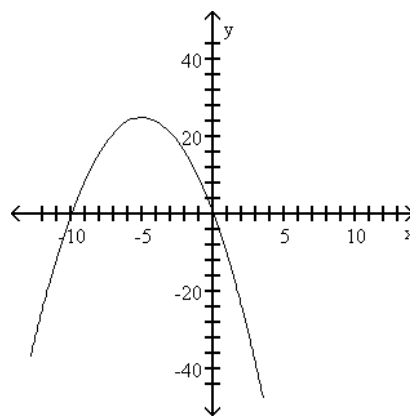
25) $f(x) = -x^2 - 10x$

7

A)

B)

C)

D)

Find the vertex and axis of symmetry of the graph of the function.

26) $f(x) = -x^2 + 8x$

    A) $(4, 16)$; $x = 4$ B) $(16, -4)$; $x = 16$

    C) $(-4, -16)$; $x = -4$ D) $(-16, 4)$; $x = -16$

26) _____

Determine the domain and the range of the function.

27) $f(x) = -x^2 - 6x - 5$

    A) domain: all real numbers
       range: $\{y \mid y \le 4\}$

    B) domain: $\{x \mid x \le -3\}$
       range: $\{y \mid y \le 4\}$

    C) domain: all real numbers
       range: $\{y \mid y \le -4\}$

    D) domain: $\{x \mid x \le -3\}$
       range: $\{y \mid y \le -4\}$

27) _____

Solve the problem.

28) The owner of a video store has determined that the profits P of the store are approximately given by $P(x) = -x^2 + 150x + 63$, where x is the number of videos rented daily. Find the maximum profit to the nearest dollar.

    A) $11,250   B) $5625   C) $11,313   D) $5688

28) _____

8

29) The manufacturer of a CD player has found that the revenue R (in dollars) is $R(p) = -5p^2 + 1730p$, when the unit price is p dollars. If the manufacturer sets the price p to maximize revenue, what is the maximum revenue to the nearest whole dollar?

29) _____

    A) $598,580   B) $299,290   C) $149,645   D) $1,197,160

Solve the inequality.

30) $x^2 - 6x \geq 0$

30) _____

    A) $\{x \mid -6 \leq x \leq 0\}$; $[-6, 0]$ B) $\{x \mid x \leq -6 \text{ or } x \geq 0\}$; $(-\infty, -6]$ or $[0, \infty)$

    C) $\{x \mid x \leq 0 \text{ or } x \geq 6\}$; $(-\infty, 0]$ or $[6, \infty)$ D) $\{x \mid 0 \leq x \leq 6\}$; $[0, 6]$

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

31) $f(x) = \dfrac{4}{3} - \dfrac{1}{3}x$

31) _____

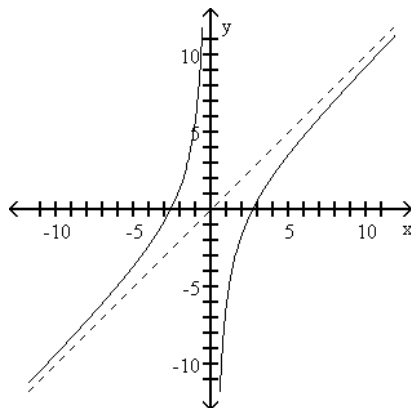   A) Yes; degree 0   B) Yes; degree 1

    C) No; x has a fractional coefficient   D) Yes; degree 3

Use the graph to determine the domain and range of the function.

32)

32) _____

    A) domain: all real numbers   B) domain: all real numbers
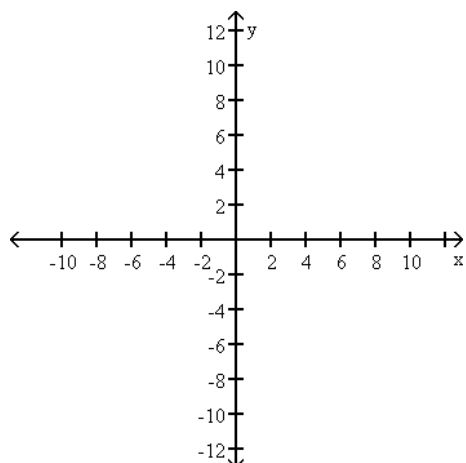   range: all real numbers   range: $\{y \mid y \neq 0\}$

    C) domain: $\{x \mid x \neq 0\}$ D) domain: $\{x \mid x \neq 0\}$
        range: all real numbers   range: $\{y \mid y \neq 0\}$
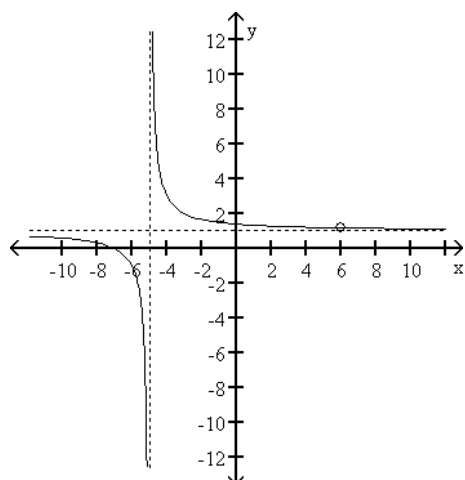
Graph the function.

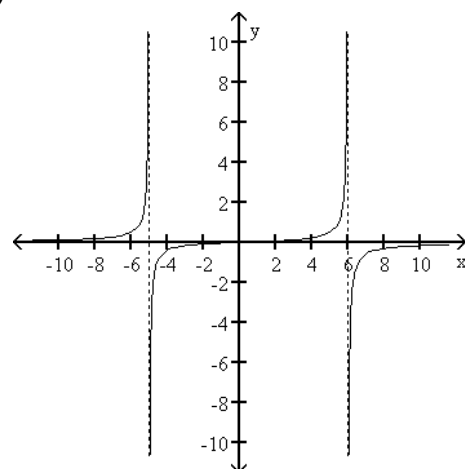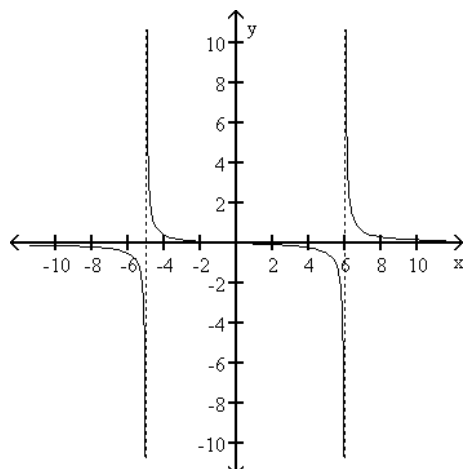33) $f(x) = \dfrac{x^2 + x - 42}{x^2 - x - 30}$
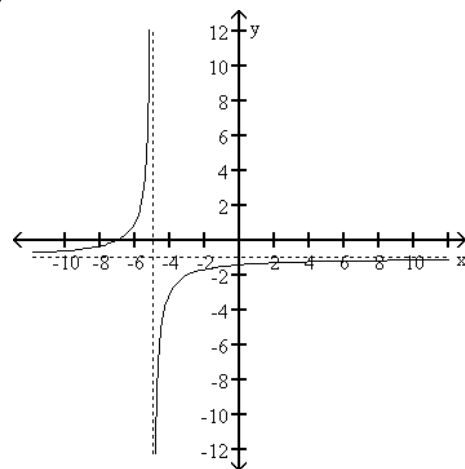
33) _____

A)

B)

C)

D)

Determine where the graph of f is below the graph of g by solving the inequality $f(x) \leq g(x)$.

34) $f(x) = x^4 + 3$
$g(x) = x + 3$

34) _____

    A) $f(x) \leq g(x)$ if $0 \leq x \leq 1$ B) $f(x) \leq g(x)$ if $x \leq -1$ or $x \geq 1$

    C) $f(x) \leq g(x)$ if $-1 \leq x \leq 1$ D) $f(x) \leq g(x)$ if $x \leq 0$ or $x \geq 1$

Use the Factor Theorem to determine whether x - c is a factor of f(x).

35) $f(x) = x^4 + 10x^3 + 3x^2 + 22x - 80$; $x + 10$

35) _____

    A) Yes   B) No

Use the given zero to find the remaining zeros of the function.

36) $f(x) = x^3 + 2x^2 - 6x + 8$; zero: $1 + i$

36) _____

    A) $1 - i, 4$ B) $1 - i, 4i$ C) $1 - i, -4$ D) $-4, 4$

Evaluate the expression using the values given in the table.

37) $(f \circ g)(4)$

37) _____

x	1	5	8	12
f(x)	-2	8	2	13

x	-5	-2	1	4
g(x)	1	-5	5	8

    A) 5   B) 8   C) 2   D) Undefined

Indicate whether the function is one-to-one.

38) $\{(-20, 19), (-8, 1), (-13, -15)\}$

38) _____

    A) Yes   B) No

Solve the equation.

39) $2^{1 + 2x} = 8$

39) _____

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

The Richter scale converts seismographic readings into numbers for measuring the magnitude of an earthquake according to this function $M(x) = \log\left(\dfrac{x}{x_0}\right)$, where $x_0 = 10^{-3}$.

40) Find the magnitude (to one decimal place) of an earthquake whose seismographic reading is 2000 millimeters at a distance of 100 kilometers from its epicenter. Round the answer to the nearest tenth.

40) _____

    A) 5.9   B) 6.3   C) 7.3   D) 6.4

Suppose that ln 2 = a and ln 5 = b. Use properties of logarithms to write each logarithm in terms of a and b.

41) ln $\sqrt[6]{20}$

41) _____

    A) $\frac{1}{6}(2a + b)$ B) $\frac{1}{3}(a + b)$ C) $\frac{1}{6}(a^2 + b)$ D) $\frac{1}{3}(a - b)$

Solve the problem.

42) $f(x) = \log_2(x - 5)$ and $g(x) = \log_2(5x - 3)$.

42) _____

    Solve $f(x) + g(x) = 6$.

    A) {-7}   B) {128}   C) {-128}   D) {7}

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

43) {(-3, 14), (-2, 9), (0, 5), (2, 9), (4, 21)}

43) _____

    A) function   B) function   C) not a function

       domain: {14, 9, 5, 21}   domain: {-3, -2, 0, 2, 4}

       range: {-3, -2, 0, 2, 4}   range: {14, 9, 5, 21}

Find the value for the function.

44) Find -f(x) when $f(x) = |x| + 3$.

44) _____

    A) $|-x| + 3$ B) $-|x| + 3$ C) $-|x| - 3$ D) $|-x| - 3$

Find the domain of the function.

45) $f(x) = 8x + 6$

45) _____

    A) $\{x \mid x \neq 0\}$ B) all real numbers

    C) $\{x \mid x > 0\}$ D) $\{x \mid x \geq -6\}$

Answer the question about the given function.

46) Given the function $f(x) = 2x^2 + 4x + 2$, list the y-intercept, if there is one, of the graph of f.

46) _____
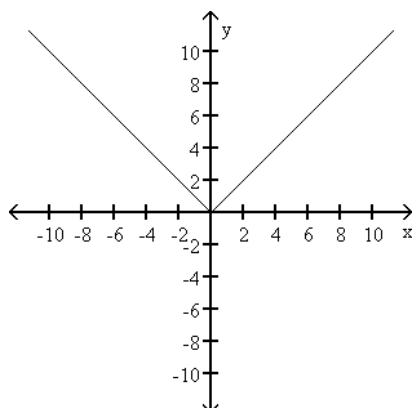
    A) 6   B) 0   C) 2   D) 8

The graph of a function is given. Decide whether it is even, odd, or neither.

47)

47) _____

    A) even   B) odd   C) neither
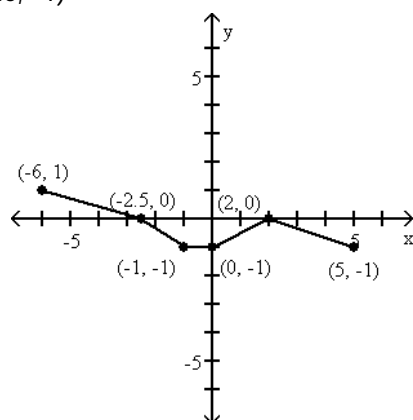
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The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

48) (-2.5, -1)
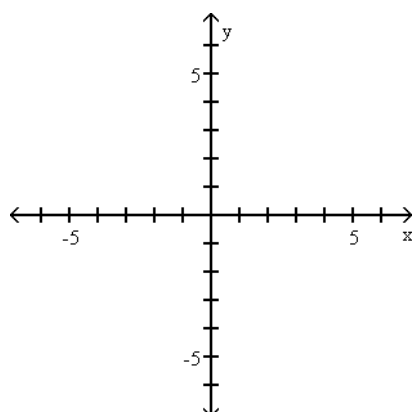
48) _____

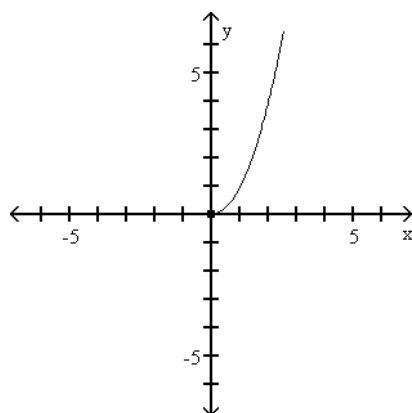

A) increasing   B) constant   C) decreasing
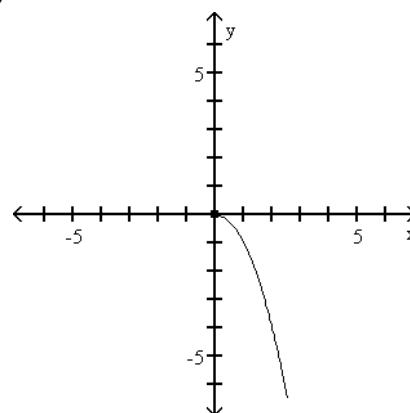
Graph the function.
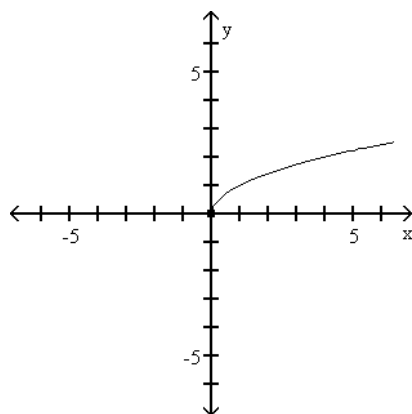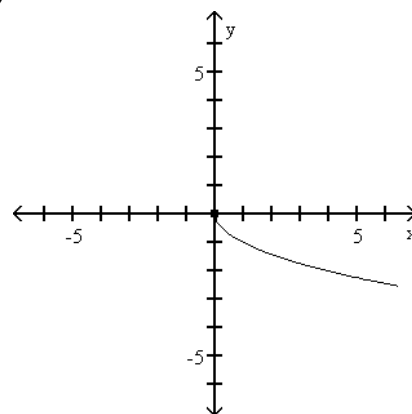
49) $f(x) = \sqrt{x}$

49) _____

A)

B)

13

C)

D)

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

50) The reflection of the graph of y = f(x) across the x-axis   50) _____

   A) (-2, -4)   B) (2, 4)   C) (-2, 4)   D) (2, -4)