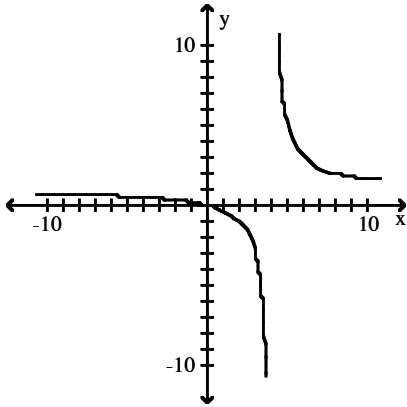Math 101 Chapter Two Practice Exam

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

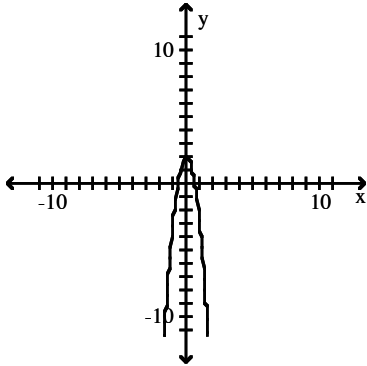**Determine the intervals of the domain over which the function is continuous.**
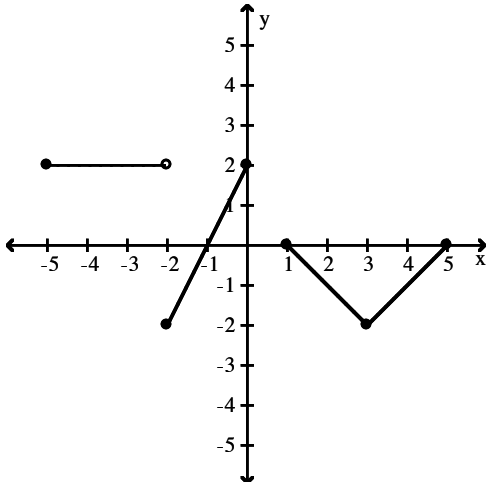
1)

1) _____

Determine the intervals on which the function is increasing, decreasing, and constant.
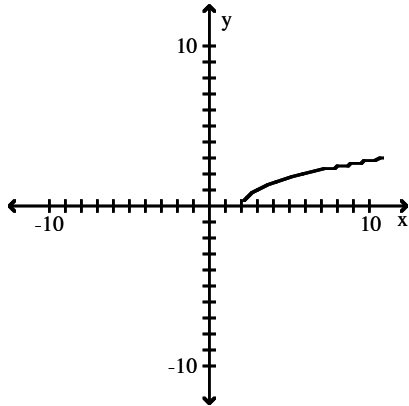
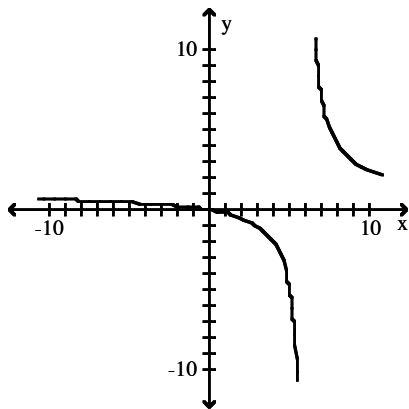2)

2) _____

3)

3) _____

Find the domain and the range for the function.

4)

4) _____

5)

5) _____

Determine if the function is increasing or decreasing over the interval indicated.

6) $f(x) = (x^2 - 9)^2$; $(3, \infty)$

6) _____

7) $f(x) = \dfrac{1}{x^2 + 1}$; $(-\infty, 0)$

7) _____

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

8) $f(x) = 3x^2 - 2$

8) _____

9) $f(x) = (x + 7)(x + 6)$

9) _____

10) $f(x) = \left| x^2 + x \right|$

10) _____

Determine whether the graph of the given function is symmetric with respect to the y–axis, symmetric with respect to the origin, or neither.

11) $f(x) = |2x| + 3$

11) _____

2

12) $f(x) = x + \dfrac{1}{x^2}$

12) _____

Write an equation that results in the indicated translation.
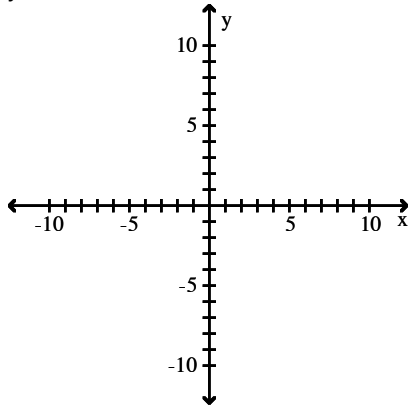
    13) The absolute value function, shifted 7 units upward

13) _____

Use translations of one of the basic functions to sketch a graph of y = f(x) by hand.
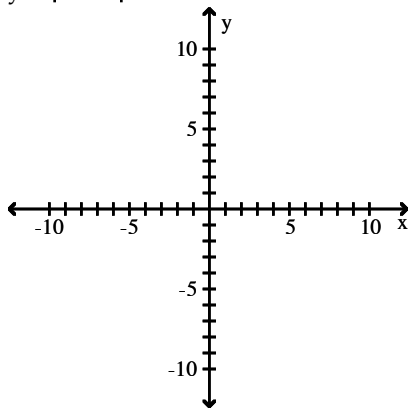
    14) $y = x^2 - 4$

14) _____

    15) $y = |x - 4|$
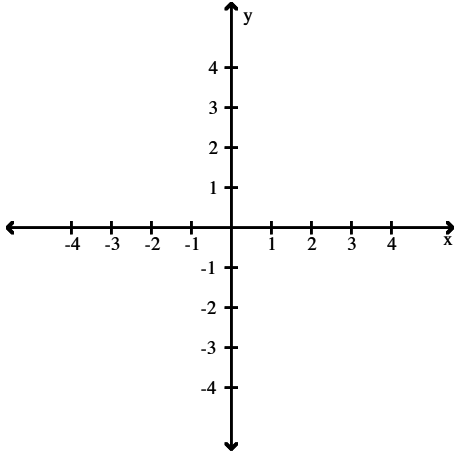
15) _____

Write an equation that results in the indicated translation.

    16) The square root function, shifted 4 units to the left

16) _____

Use translations of one of the basic functions to sketch a graph of y = f(x) by hand.
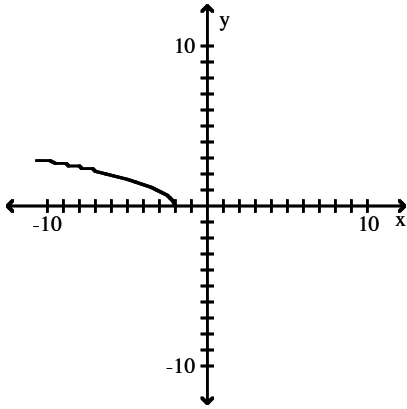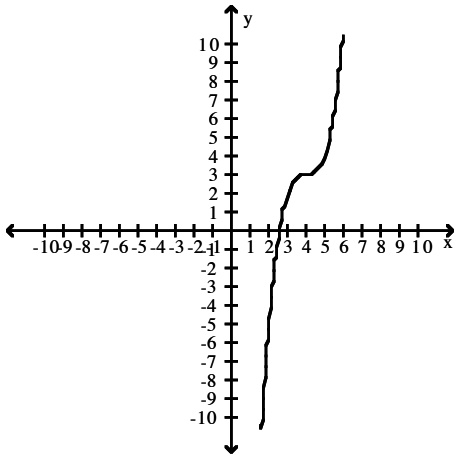
17) $y = \sqrt{x + 2} + 1$

17) _____

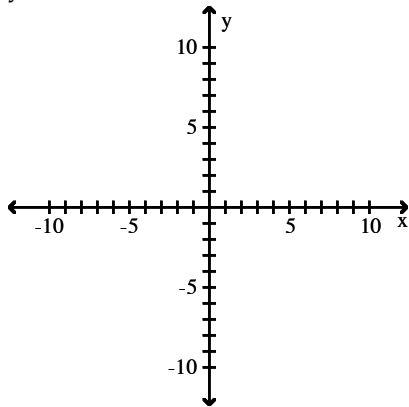**Determine the domain and range of the function from the graph.**

18)

18) _____

19)

19) _____

Use translations of one of the basic functions defined by $y = x^2$, $y = x^3$, $y = \sqrt{x}$, or $y = |x|$ to sketch a graph of $y = f(x)$ by hand. Do not use a calculator.
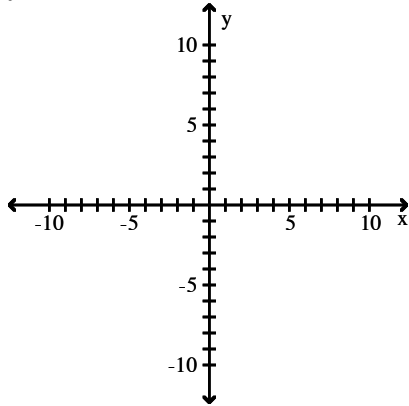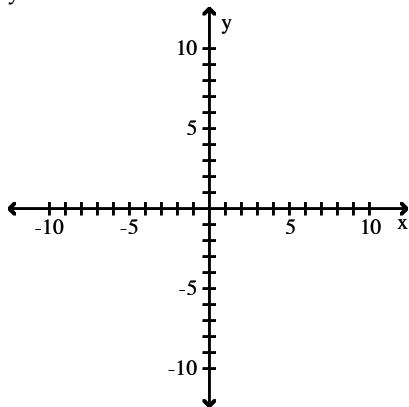
20) $y = \sqrt{x} - 1$

20) _____

21) $y = (x - 3)^2 - 2$

21) _____

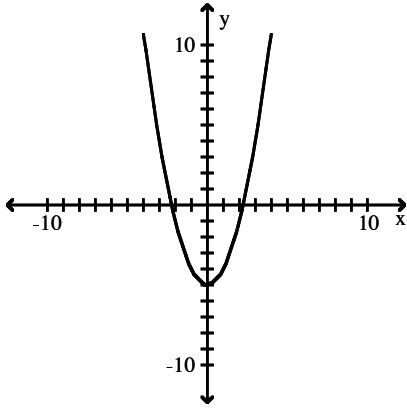22) $y = \sqrt{x + 3} - 1$

22) _____

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

The graph is a translation of one of the basic functions defined by $y = x^2$, $y = x^3$, $y = \sqrt{x}$, or $y = |x|$. Find the equation that defines the function.

23)

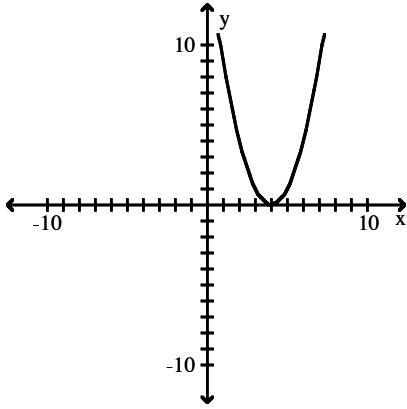A) $y = (x - 5)^2$ B) $y = (x + 5)^2$ C) $y = x^2 - 5$ D) $y = (x - 5)^2 + 2$

23) _____

24)

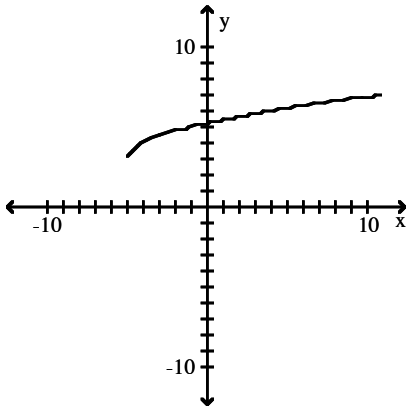A) $y = (x - 4)^2$ B) $y = (x - 4)^2 + 2$ C) $y = (x + 4)^2$ D) $y = x^2 - 4$

24) _____

25)

A) $y = \sqrt{x} + 3$ B) $y = \sqrt{x + 5}$ C) $y = \sqrt{x - 5}$ D) $y = \sqrt{x + 5} + 3$

25) _____

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

Write the equation that results in the desired transformation.

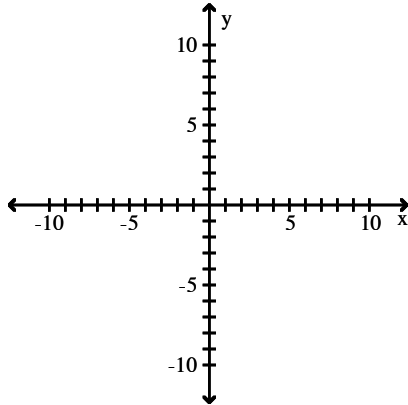26) The cubing function, vertically shrunk by a factor of 0.9

26) _____

27) The absolute value function, vertically stretched by a factor of 2.4 and reflected across the x–axis

27) _____

Use transformations of graphs to sketch the graphs of y_1 and y_2. Graph y_2 as a dashed curve.

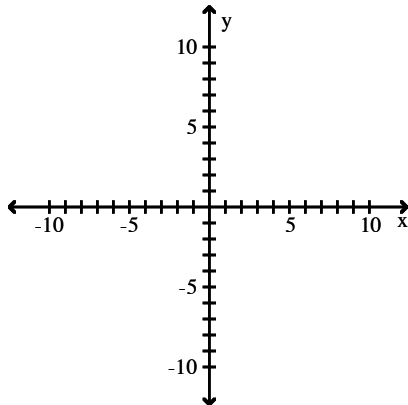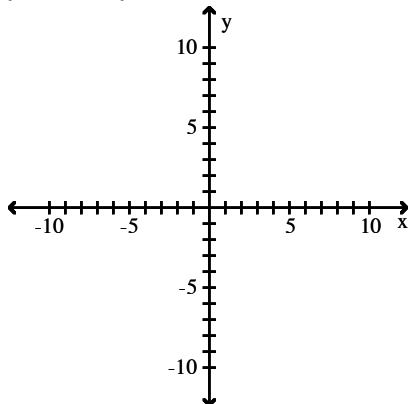28) $y_1 = |x|$; $y_2 = |x - 2|$

28) _____

29) $y_1 = x^3$; $y_2 = (x + 5)^3$

29) _____

30) $y_1 = \sqrt[3]{x}$, $y_2 = \sqrt[3]{-x} + 3$

30) _____

Fill in each blank with the appropriate response.

31) The graph of $y = -5(x+3)^2 - 8$ can be obtained from the graph of $y = x^2$ by shifting horizontally ___ units to the _____ , vertically stretching by a factor of ___ , reflecting across the __-axis, and shifting vertically ___ units in the _____ direction.

31) _____

Give the equation of the function whose graph is described.

32) The graph of $y = x^2$ is shifted 2 units to the left. This graph is then vertically shrunk by a factor of $\frac{1}{5}$ and reflected across the x–axis. Finally, the graph is shifted 8 units downward.

32) _____

33) The graph of $y = |x|$ is reflected across the y–axis. This graph is then vertically stretched by a factor of 7.1. Finally, the graph is shifted 5 units downward.
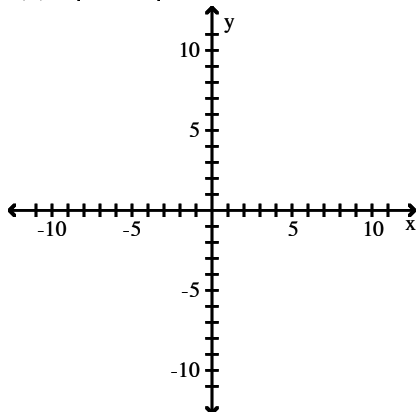
33) _____

The graph of the given function is drawn with a solid line. The graph of a function, g(x), transformed from this one is drawn with a dashed line. Find a formula for g(x).
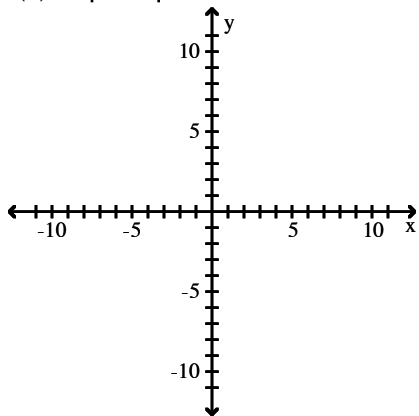
34) $f(x) = x^2$

34) _____
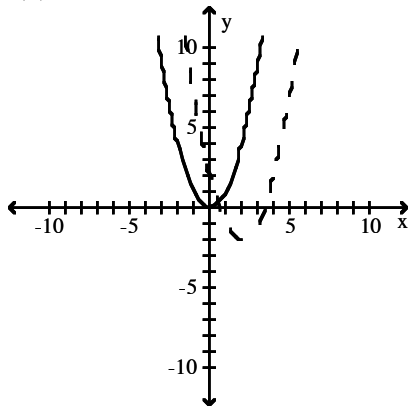
Use transformations to graph the function.

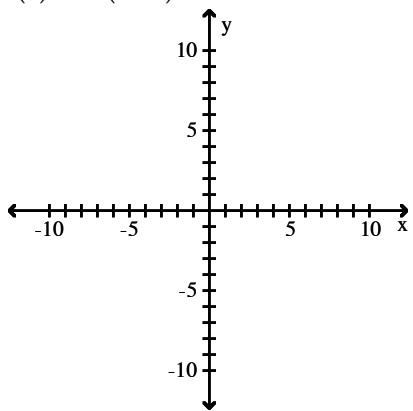35) $f(x) = |-3 - x|$

35) _____
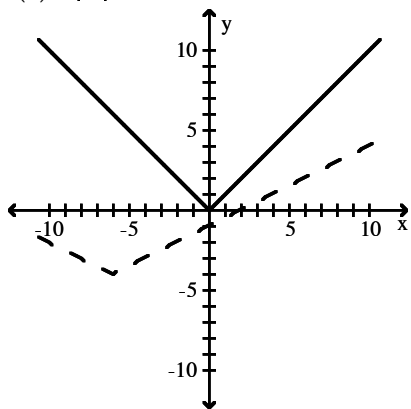

8

36) $f(x) = 4|x - 5| - 5$

36) _____

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

37) _____

The graph of the given function is drawn with a solid line. The graph of a function, g(x), transformed from this one is drawn with a dashed line. Find a formula for g(x).
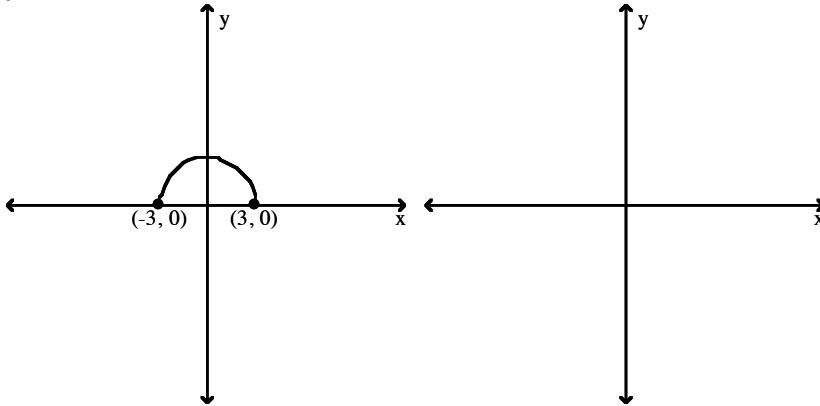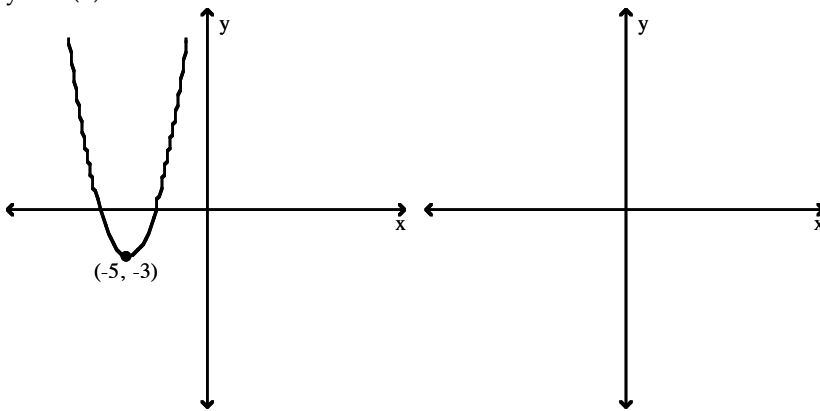
38) $f(x) = |x|$

38) _____

Use the accompanying graph of y = f(x) to sketch the graph of the indicated function.
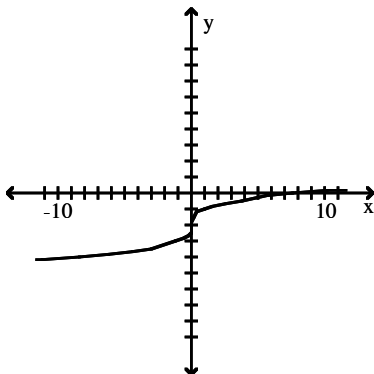
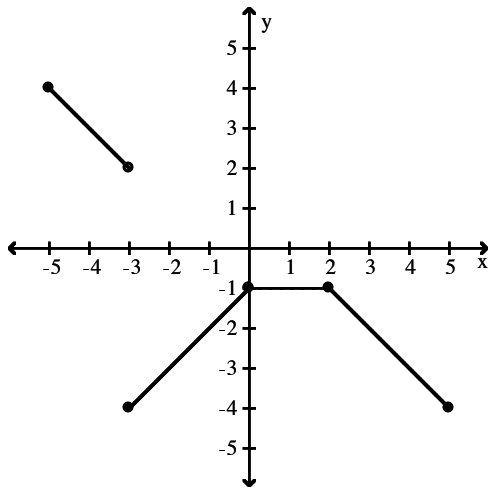39) y = f(−x)

39) _____

40) y = −f(x)

(-5, -3)

40) _____

Determine the intervals on which the function is increasing, decreasing, and constant.
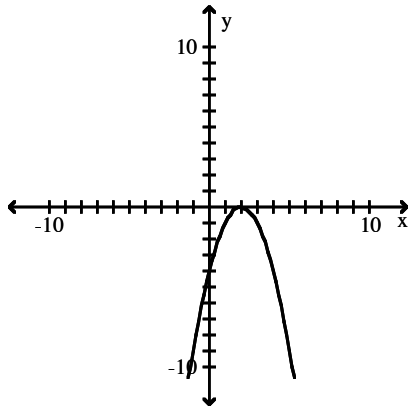
41)

41) _____

42)

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

The figure shows a transformation of the graph of $y = x^2$. Write the equation for the graph.

43)

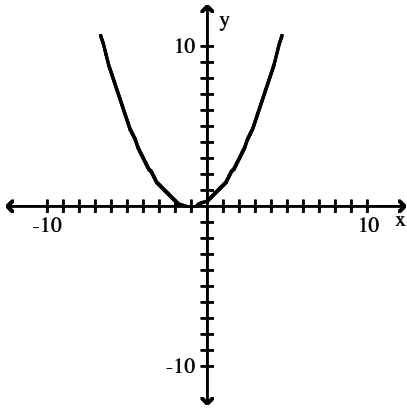A) $g(x) = -x^2 - 2$ B) $g(x) = -x^2 + 2$ C) $g(x) = (x + 2)^2$ D) $g(x) = -(x - 2)^2$

44)

44) _____

A) $g(x) = \frac{1}{3}(x+1)^2$

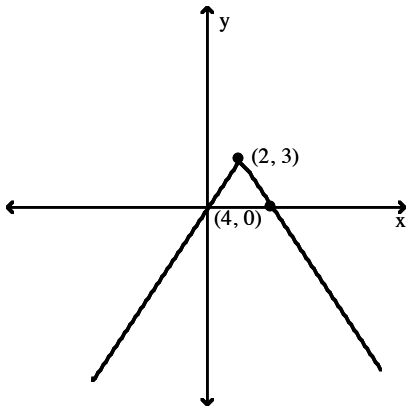B) $g(x) = (x-1)^2$

C) $g(x) = \frac{1}{3}x^2 - 1$

D) $g(x) = \frac{1}{3}x^2 + 1$

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

The graph of the function y = f(x) is given below. Sketch the graph of $y = |f(x)|$.
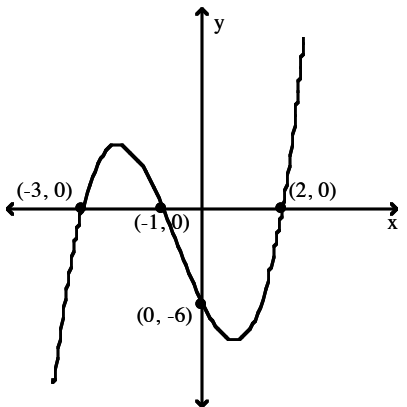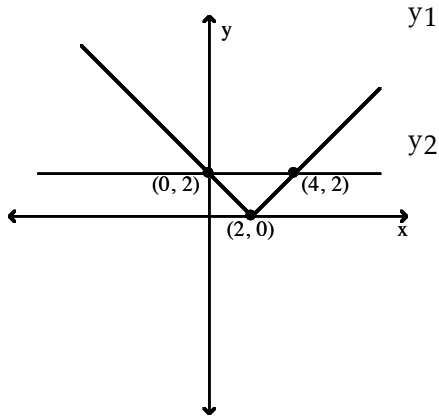
45)

45) _____

46)

46) _____

Use the graph, along with the indicated points, to give the solution set of the equation or inequality.

47) $y_1 > y_2$

Solve the equation.

48) $\left| -3x + 1 \right| = 12$

49) $\left| 7x + 2 \right| + 7 = 14$

Solve the inequality.

50) $\left| 2 - 3x \right| \le 11$

51) $\left| x + 6 \right| - 2 > 16$

Solve the equation.

52) $\left| 2x + 8 \right| = \left| x + 9 \right|$

Solve the problem.

53) The formula to find Celsius temperature, C, given Fahrenheit temperature, F, is $C = \dfrac{5}{9}(F - 32)$. If the processing temperature of a chemical ranges from 302°F to 347°F, inclusive, then what is the range of its temperature in degrees Celsius?

54) The average annual growth rate of a coral reef in inches satisfies the inequality $\left| x - 2.74 \right| \le 2.17$. What range of growth corresponds to this inequality?
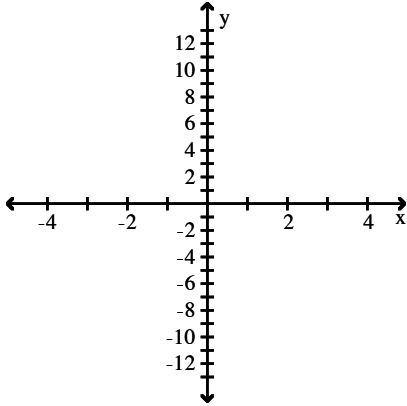
Find the requested value.

55)

$f(7)$ for $f(x) = \begin{cases} 4x + 6 & \text{if } x \le 0 \\ 5 - 6x & \text{if } 0 < x < 6 \\ x & \text{if } x \ge 6 \end{cases}$
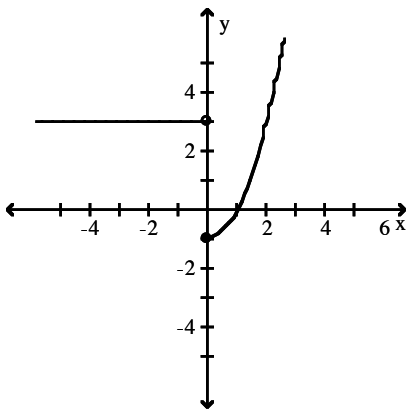
47) _____

48) _____

49) _____

50) _____

51) _____

52) _____

53) _____

54) _____

55) _____

Graph the function.

56)

$$f(x) = \begin{cases} x^2 - 9 & \text{if } x < -1 \\ 0 & \text{if } -1 \le x \le 1 \\ x^2 + 9 & \text{if } 1 < x \end{cases}$$
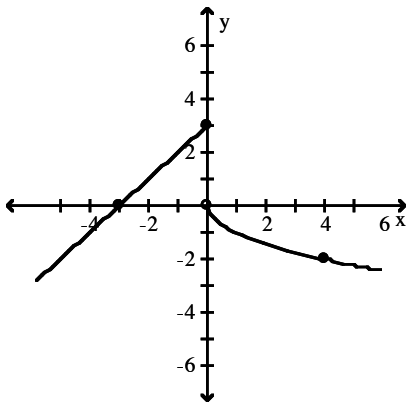
Give a formula for a piecewise–defined function f for the graph shown.

57)

58)

14

Find the requested composition or operation.

59) $f(x) = 4x^2 + 2x + 4$, $g(x) = 2x - 8$

    Find $(g \circ f)(x)$.

59) _____

60) $f(x) = \dfrac{7}{x - 3}$, $g(x) = \dfrac{4}{3x}$

    Find $(f \circ g)(x)$.

60) _____

Perform the requested composition or operation.

61) Find $(f - g)(-2)$ when $f(x) = -4x^2 + 6$ and $g(x) = x - 6$.

61) _____

62) Find $(fg)(3)$ when $f(x) = x - 1$ and $g(x) = -2x^2 + 13x - 7$.
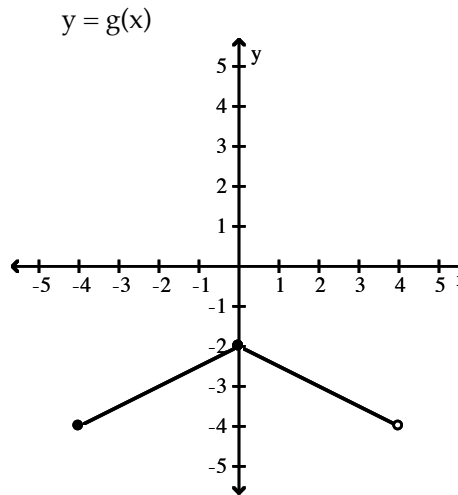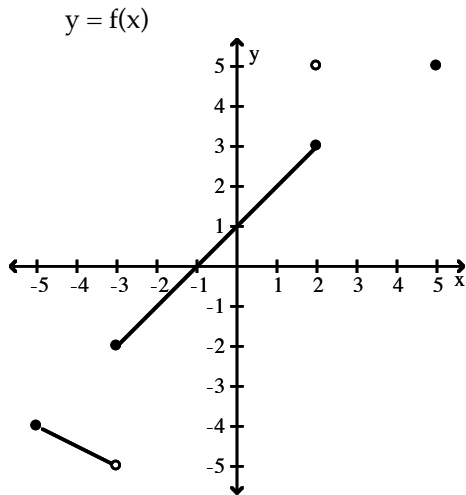
62) _____

Find the specified domain.

63) For $f(x) = 2x - 5$ and $g(x) = \sqrt{x + 2}$, what is the domain of $(f \circ g)$?

63) _____

Use the graphs to evaluate the expression.

64) $f(-1) - g(-2)$

64) _____

$$y = f(x) \qquad\qquad y = g(x)$$
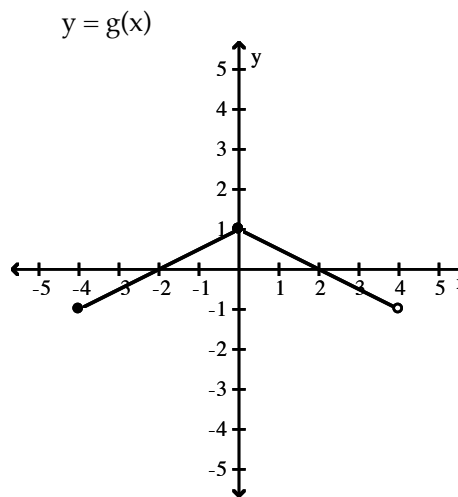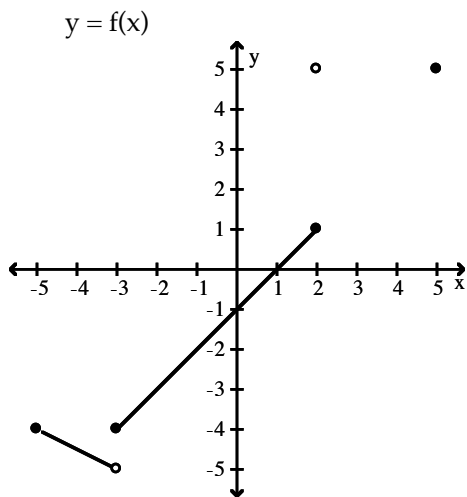

Find the specified domain.

65) For $f(x) = x^2 - 64$ and $g(x) = 2x + 3$, what is the domain of $\left(\dfrac{g}{f}\right)$?

65) _____

15

Use the graphs to evaluate the expression.

66) $(f \circ g)(-4)$

66) _____

y = f(x)

y = g(x)

Determine whether $(f \circ g)(x) = x$ and whether $(g \circ f)(x) = x$.

67) $f(x) = \sqrt[5]{x - 4}$, $g(x) = x^5 + 4$

67) _____

68) $f(x) = x^3 + 1$, $g(x) = \sqrt[3]{x - 1}$

68) _____