

54. $f(x) = (x - c)^2$
 (a) $c = 0, 1, 2, 3$; $[-5, 5]$ by $[-10, 10]$
 (b) $c = 0, -1, -2, -3$; $[-5, 5]$ by $[-10, 10]$
 (c) How does the value of c affect the graph?

55. $f(x) = (x - c)^3$
 (a) $c = 0, 2, 4, 6$; $[-10, 10]$ by $[-10, 10]$
 (b) $c = 0, -2, -4, -6$; $[-10, 10]$ by $[-10, 10]$
 (c) How does the value of c affect the graph?

56. $f(x) = cx^2$
 (a) $c = 1, \frac{1}{2}, 2, 4$; $[-5, 5]$ by $[-10, 10]$
 (b) $c = 1, -1, -\frac{1}{2}, -2$; $[-5, 5]$ by $[-10, 10]$
 (c) How does the value of c affect the graph?

57. $f(x) = x^c$
 (a) $c = \frac{1}{2}, \frac{1}{4}, \frac{1}{6}$; $[-1, 4]$ by $[-1, 3]$
 (b) $c = 1, \frac{1}{3}, \frac{1}{5}$; $[-3, 3]$ by $[-2, 2]$
 (c) How does the value of c affect the graph?

58. $f(x) = 1/x^n$
 (a) $n = 1, 3$; $[-3, 3]$ by $[-3, 3]$
 (b) $n = 2, 4$; $[-3, 3]$ by $[-3, 3]$
 (c) How does the value of n affect the graph?

59–72 ■ Sketch the graph of the piecewise defined function.

59. $f(x) = \begin{cases} 0 & \text{if } x < 2 \\ 1 & \text{if } x \geq 2 \end{cases}$

60. $f(x) = \begin{cases} 1 & \text{if } x \leq 1 \\ x + 1 & \text{if } x > 1 \end{cases}$

61. $f(x) = \begin{cases} 3 & \text{if } x < 2 \\ x - 1 & \text{if } x \geq 2 \end{cases}$

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

63. $f(x) = \begin{cases} x & \text{if } x \leq 0 \\ x + 1 & \text{if } x > 0 \end{cases}$

64. $f(x) = \begin{cases} 2x + 3 & \text{if } x < -1 \\ 3 - x & \text{if } x \geq -1 \end{cases}$

65. $f(x) = \begin{cases} -1 & \text{if } x < -1 \\ 1 & \text{if } -1 \leq x \leq 1 \\ -1 & \text{if } x > 1 \end{cases}$

66. $f(x) = \begin{cases} -1 & \text{if } x < -1 \\ x & \text{if } -1 \leq x \leq 1 \\ 1 & \text{if } x > 1 \end{cases}$

67. $f(x) = \begin{cases} 2 & \text{if } x \leq -1 \\ x^2 & \text{if } x > -1 \end{cases}$

68. $f(x) = \begin{cases} 1 - x^2 & \text{if } x \leq 2 \\ x & \text{if } x > 2 \end{cases}$

69. $f(x) = \begin{cases} 0 & \text{if } |x| \leq 2 \\ 3 & \text{if } |x| > 2 \end{cases}$

70. $f(x) = \begin{cases} x^2 & \text{if } |x| \leq 1 \\ 1 & \text{if } |x| > 1 \end{cases}$

71. $f(x) = \begin{cases} 4 & \text{if } x < -2 \\ x^2 & \text{if } -2 \leq x \leq 2 \\ -x + 6 & \text{if } x > 2 \end{cases}$

72. $f(x) = \begin{cases} -x & \text{if } x \leq 0 \\ 9 - x^2 & \text{if } 0 < x \leq 3 \\ x - 3 & \text{if } x > 3 \end{cases}$

73–74 ■ Use a graphing device to draw the graph of the piecewise defined function. (See the margin note on page 222.)

73. $f(x) = \begin{cases} x + 2 & \text{if } x \leq -1 \\ x^2 & \text{if } x > -1 \end{cases}$

74. $f(x) = \begin{cases} 2x - x^2 & \text{if } x > 2 \\ (x - 1)^3 & \text{if } x \leq 2 \end{cases}$

75. A taxi company charges \$2.00 for the first mile (or part of a mile) and 20 cents for each succeeding tenth of a mile (or part). Express the cost C (in dollars) of a ride as a function of the distance x traveled (in miles) for $0 < x < 2$, and sketch the graph of this function.

76. The domestic postage rate for first-class letters weighing 12 oz or less is 33 cents for a letter weighing 1 oz or less and 22 cents for each additional ounce (or part of an ounce). Express the postage P as a function of the weight x of a letter, with $0 < x \leq 12$.

77–80 ■ Find a function whose graph is the given curve.

77. The line segment joining the points $(-2, 1)$ and $(4, -6)$

78. The line segment joining the points $(-3, -2)$ and $(6, 3)$

79. The bottom half of the parabola $x + (y - 1)^2 = 0$

80. The top half of the circle $(x - 1)^2 + y^2 = 1$

DISCOVERY • DISCUSSION

81. When Does a Graph Represent a Function? For every integer n , the graph of the equation $y = x^n$ is the graph of a function, namely $f(x) = x^n$. Explain why the graph of $x = y^2$ is *not* the graph of a function of x . Is the graph of $x = y^3$ the graph of a function of x ? If so, of what function of x is it the graph? Determine for what integers n the graph of $x = y^n$ is the graph of a function of x .