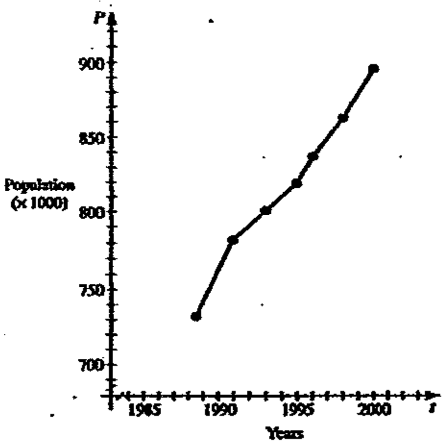
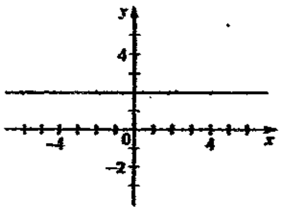
73.



3.2

Section [illegible]

1.



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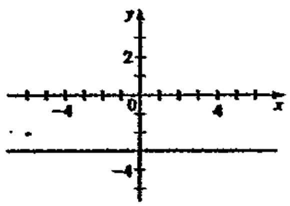

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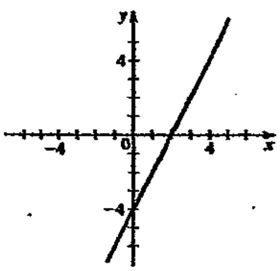

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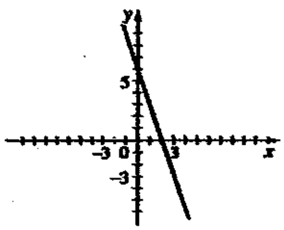

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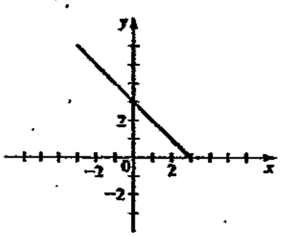

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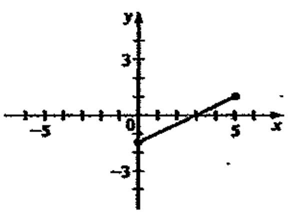

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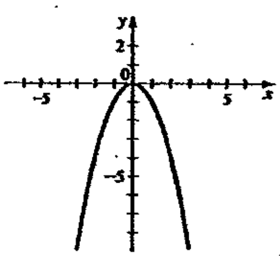

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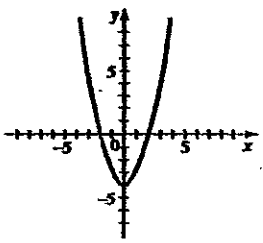

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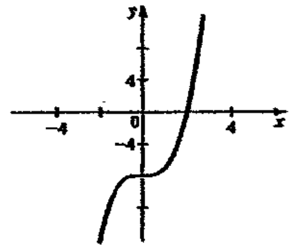

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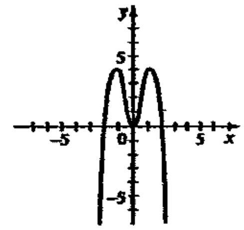

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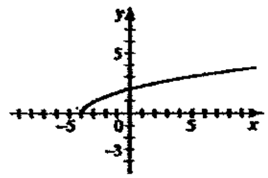

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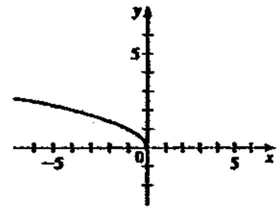

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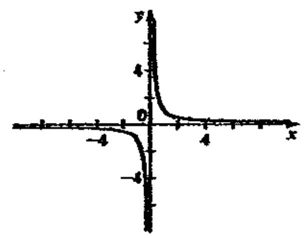

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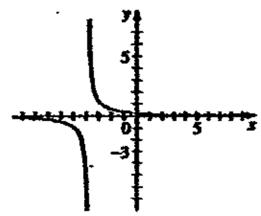

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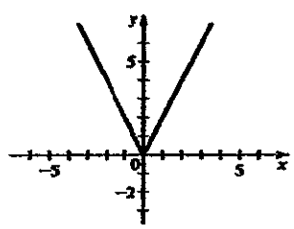

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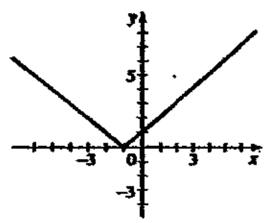

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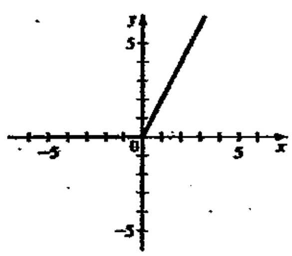

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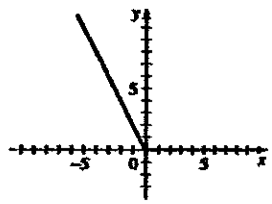

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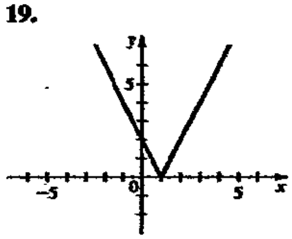

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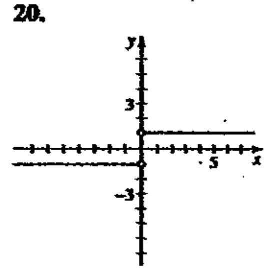

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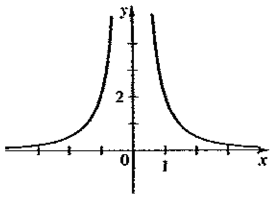

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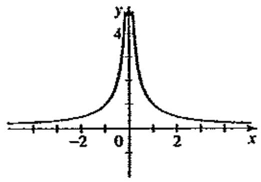
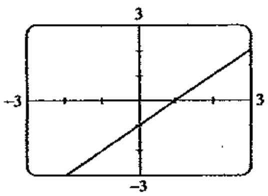
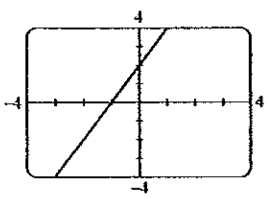


23. (a) 1, −1, 3, 4 (b) Domain [−3, 4], range [−1, 4]
24. (a) 3, 2, −2, 1, 0 (b) Domain [−4, 4], range [−2, 3]
25. (a) $f(0)$ (b) $g(-3)$ (c) −2, 2
26. (a) 1.2 (b) 2.1 (c) 0.4, 3.6
27. (a)



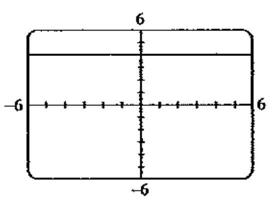
(b) Domain $(-\infty, \infty)$, range $(-\infty, \infty)$

28. (a)



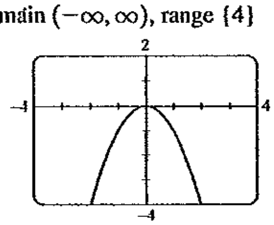
(b) Domain $(-\infty, \infty)$, range $(-\infty, \infty)$

29. (a)



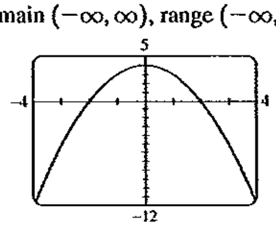
(b) Domain $(-\infty, \infty)$, range {4}

30. (a)



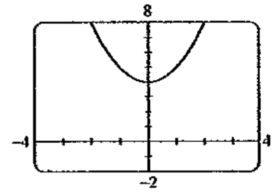
(b) Domain $(-\infty, \infty)$, range $(-\infty, 0]$

31. (a)



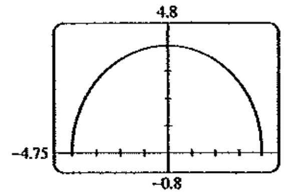
(b) Domain $(-\infty, \infty)$, range $(-\infty, 4]$

32. (a)



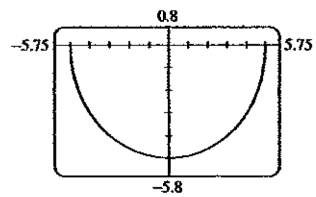
(b) Domain $(-\infty, \infty)$, range $[4, \infty)$

33. (a)



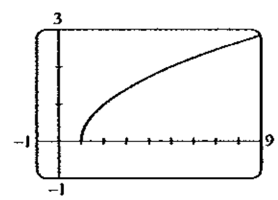
(b) Domain [−4, 4], range [0, 4]

34. (a)



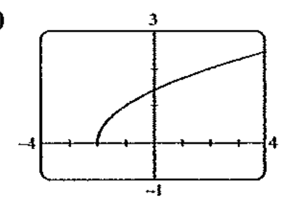
(b) Domain [−5, 5], range [−5, 0]

35. (a)



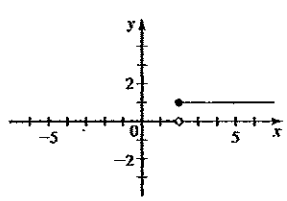
(b) Domain $[1, \infty)$, range $[0, \infty)$

36. (a)



(b) Domain $[-2, \infty)$, range $[0, \infty)$

37.



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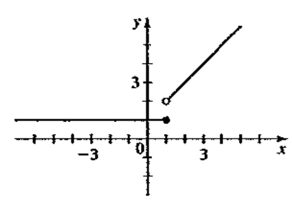

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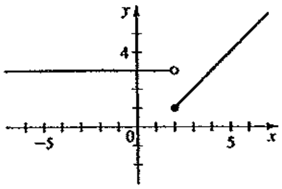

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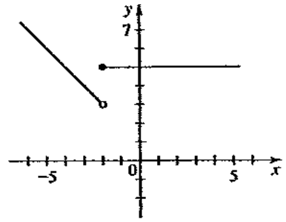

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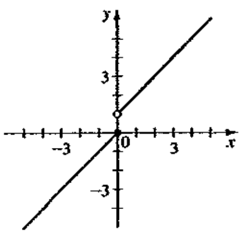

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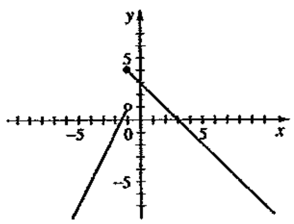

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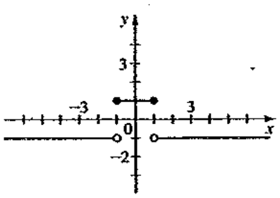

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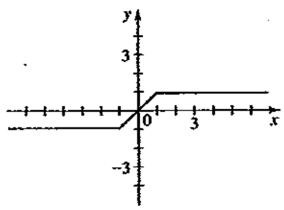

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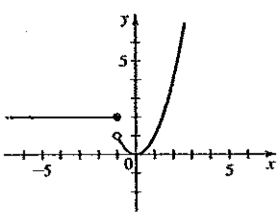

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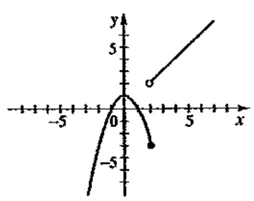

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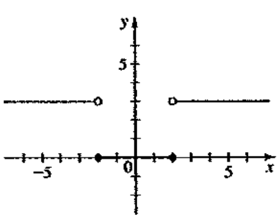

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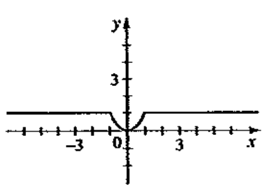

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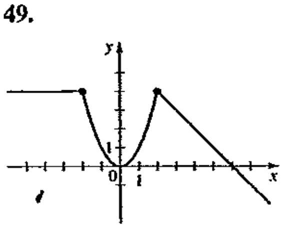

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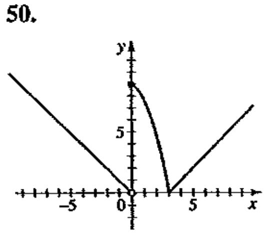

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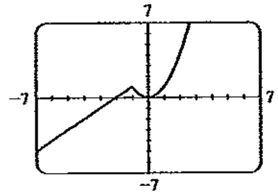

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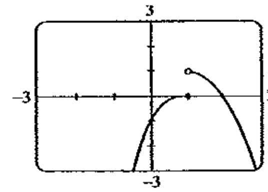
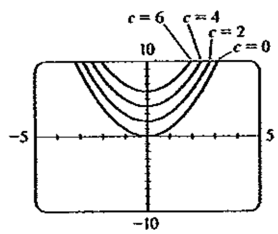


53. $f(x) = \begin{cases} -2 & \text{if } x < -2 \\ x & \text{if } -2 \le x \le 2 \\ 2 & \text{if } x > 2 \end{cases}$

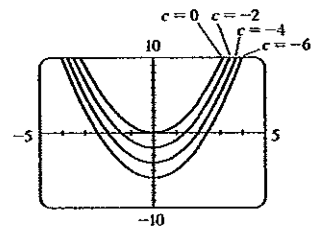
54. $f(x) = \begin{cases} 1 & \text{if } x \le -1 \\ 1 - x & \text{if } -1 < x \le 2 \\ -2 & \text{if } x > 2 \end{cases}$

55. (a) Yes (b) No (c) Yes (d) No **56.** (a) No (b) Yes (c) Yes (d) No **57.** Function, domain $[-3, 2]$, range $[-2, 2]$ **58.** Not a function **59.** Not a function **60.** Function, domain $[-3, 2]$, range $\{-2\} \cup (0, 3]$ **61.** Yes **62.** Yes **63.** No **64.** No **65.** No **66.** Yes **67.** Yes **68.** Yes **69.** Yes **70.** No **71.** Yes **72.** No

73. (a)

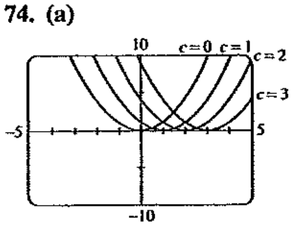


(b)

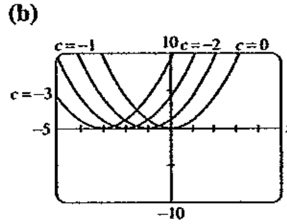


(c) If $c > 0$, then the graph of $f(x) = x^2 + c$ is the same as the graph of $y = x^2$ shifted upward c units. If $c < 0$, then the graph of $f(x) = x^2 + c$ is the same as the graph of $y = x^2$ shifted downward c units.

74. (a)

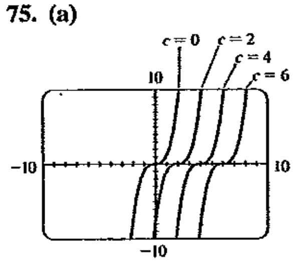


(b)

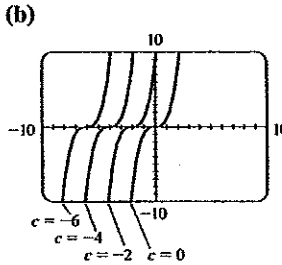


(c) The graphs in part (a) are obtained by shifting the graph of $y = x^2$ to the right 1, 2, and 3 units, while the graphs in part (b) are obtained by shifting the graph of $y = x^2$ to the left, 1, 2, and 3 units.

75. (a)

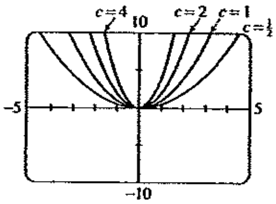


(b)

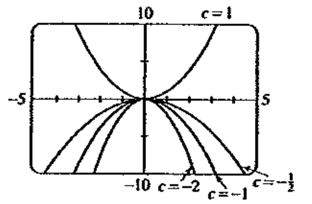


(c) If $c > 0$, then the graph of $f(x) = (x - c)^3$ is the same as the graph of $y = x^3$ shifted right c units. If $c < 0$, then the graph of $f(x) = (x - c)^3$ is the same as the graph of $y = x^3$ shifted left c units.

76. **(a)**

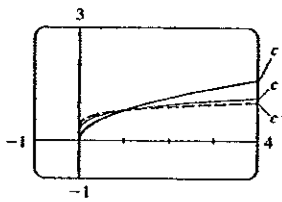


(b)

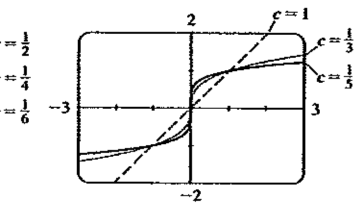


(c) As $|c|$ increases, the graph of $f(x) = cx^2$ is stretched vertically. As $|c|$ decreases, the graph of f is flattened. When $c < 0$, the graph is reflected about the x-axis.

77. **(a)**

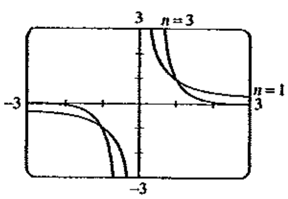


(b)

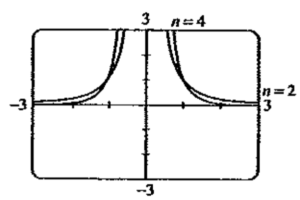


(c) Graphs of even roots are similar to $\sqrt{x}$; graphs of odd roots are similar to $\sqrt[3]{x}$. As c increases, the graph of $y = \sqrt[c]{x}$ becomes steeper near 0 and flatter when $x > 1$.

78. **(a)**



(b)



(c) As n increases, the graphs of $y = 1/x^n$ go to zero faster for x large. Also, as n increases and x goes to 0, the graphs of $y = 1/x^n$ go to infinity faster. The graphs of $y = 1/x^n$ for n odd are similar to each other. Likewise, the graphs for n even are similar to each other. **79.** $f(x) = -\frac{7}{6}x - \frac{4}{3}, -2 \le x \le 4$

80. $f(x) = \frac{5}{9}x - \frac{1}{3}, -3 \le x \le 6$

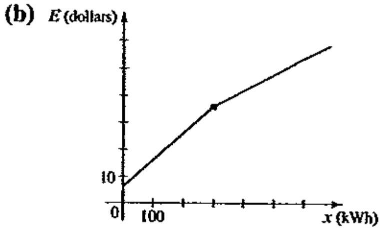
81. $f(x) = \sqrt{9 - x^2}, -3 \le x \le 3$

82. $f(x) = -\sqrt{9 - x^2}, -3 \le x \le 3$

83. This person's weight increases as he grows, then continues to increase; the person then goes on a crash diet (possibly) at age 30, then gains weight again, the weight gain eventually leveling off. **84.** The salesman travels away from home and stops to make a sales call between 9 A.M. and 10 A.M., and then travels farther from home for a sales call between 12 noon and 1 P.M. Next he travels along a route that takes him closer to home before taking him farther away from home. He makes a final sales call between 5 P.M. and 6 P.M. and then returns home. **85.** A won the race. All runners finished. Runner B fell, but got up again to finish second. **86.** **(a)** 500 MW, 725 MW **(b)** Between 3:00 A.M. and 4:00 A.M. **(c)** Just before noon **87.** **(a)** 5 s **(b)** 30 s **(c)** 17 s

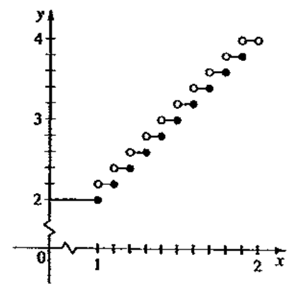
88. **(a)** $E(x) = \begin{cases} 6 + 0.10x & 0 \le x \le 300 \\ 36 + 0.06(x - 300), & x > 300 \end{cases}$

(b)

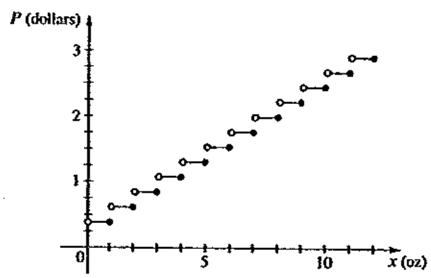


89.

$$C(x) = \begin{cases} 2 & 0 < x \le 1 \\ 2.2 & 1 < x \le 1.1 \\ 2.4 & 1.1 < x \le 1.2 \\ \vdots & \\ 4.0 & 1.9 < x < 2.0 \end{cases}$$



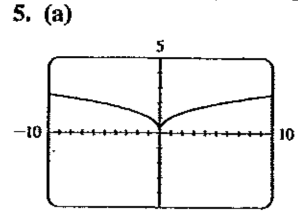
90. $P(x) = \begin{cases} 0.37 & \text{if } 0 < x \le 1 \\ 0.60 & \text{if } 1 < x \le 2 \\ 0.83 & \text{if } 2 < x \le 3 \\ \vdots & \\ 2.90 & \text{if } 11 < x \le 12 \end{cases}$



Section 3.3

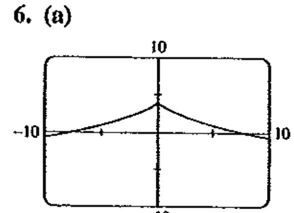
1. **(a)** $[-1, 1], [2, 4]$ **(b)** $[1, 2]$ **2.** **(a)** $[0, 1]$ **(b)** $[-2, 0], [1, 3]$ **3.** **(a)** $[-2, -1], [1, 2]$ **(b)** $[-3, -2], [-1, 1], [2, 3]$ **4.** **(a)** $[-1, 1]$ **(b)** $[-2, -1], [1, 2]$

5. **(a)**



(b) Increasing on $[0, \infty)$; decreasing on $(-\infty, 0]$

6. **(a)**



(b) Increasing on $(-\infty, 0]$; decreasing on $[0, \infty)$