Exercises 2.5, page 126

1. 3; 2; the limit does not exist.

3. The limit does not exist; 2; the limit does not exist.

5. 0; 2; the limit does not exist.

7. -2; 2; the limit does not exist. 9. True 11. True

13. False 15. True 17. False 19. True 21. 6

23. $-\frac{1}{4}$ 25. The limit does not exist. 27. -1 29. 0

31. -4 33. The limit does not exist. 35. 4 37. 0; 0

39. $x = 0$; conditions 2 and 3 41. Continuous everywhere

43. $x = 0$; condition 3 45. $(-\infty, \infty)$ 47. $(-\infty, \infty)$

49. $(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$ 51. $(-\infty, -2) \cup (-2, 1) \cup (1, \infty)$

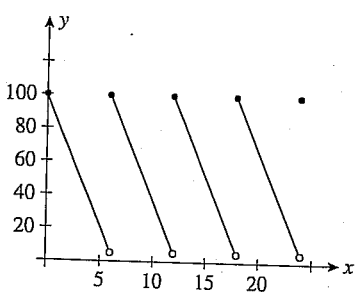
53. $(-\infty, \infty)$ 55. $(-\infty, \infty)$ 57. -1 and 1 59. 1 and 2

61. f is discontinuous at $x = 1, 2, \ldots, 12$.

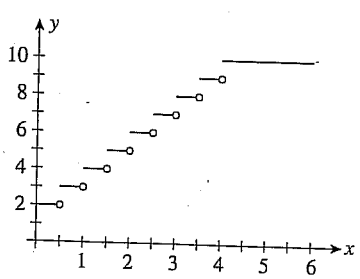
63. Michael makes progress toward solving the problem until $x = x_1$. Between $x = x_1$ and $x = x_2$, he makes no further progress. But at $x = x_2$ he suddenly achieves a breakthrough, and at $x = x_3$ he proceeds to complete the problem.

65. Conditions 2 and 3 are not satisfied at each of these points.

67.



69.



f is discontinuous at $x = \frac{1}{2}, 1, 1\frac{1}{2}, \ldots, 4$.

71. a. ∞; As the time taken to excite the tissue is made shorter and shorter, the strength of the electric current gets stronger and stronger.
b. b; As the time taken to excite the tissue is made longer and longer, the strength of the electric current gets weaker and weaker and approaches b.

73. 3 75. a. Yes b. No

77. a. f is a polynomial of degree 2. b. $f(1) = 3$ and $f(3) = -1$

79. a. f is a polynomial of degree 3. b. $f(-1) = -4$ and $f(1) = 4$

81. $x \approx 0.59$ 83. ≈ 1.34

85. c. $\frac{1}{2}, \frac{7}{2}$; Joan sees the ball on its way up $\frac{1}{2}$ sec after it was thrown and again $3\frac{1}{2}$ sec later.

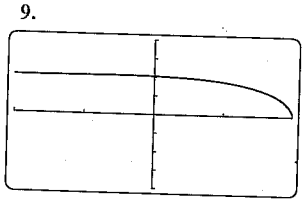
87. False 89. False 91. False 93. False 95. False

97. No 99. c. $\pm\frac{\sqrt{2}}{2}$

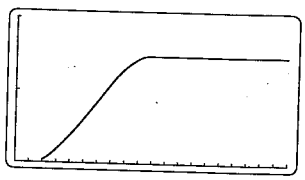
Using Technology Exercises 2.5, page 132

1. $x = 0, 1$ 3. $x = 0, \frac{1}{2}$ 5. $x = -\frac{1}{2}, 2$ 7. $x = -2, 1$

9.



11.



Exercises 2.6, page 145

1. 1.5 lb/mo; 0.58 lb/mo; 1.25 lb/mo 3. 3.1%/hr; -21.2%/hr

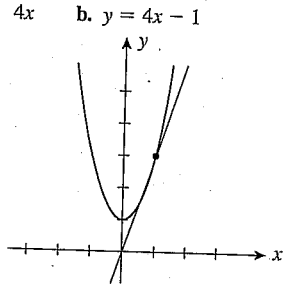
5. a. Car A b. They are traveling at the same speed.
c. Car B d. Both cars covered the same distance.

7. a. P_2 b. P_1 c. Bactericide B; bactericide A

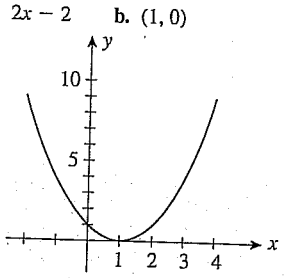
9. 0 11. 2 13. $6x$ 15. $-2x + 3$ 17. 2; $y = 2x + 7$

19. 6; $y = 6x - 3$ 21. $\frac{1}{9}$; $y = \frac{1}{9}x - \frac{2}{3}$

23. a. $4x$ b. $y = 4x - 1$
c.



25. a. $2x - 2$ b. $(1, 0)$
c.



d. 0

27. a. 6; 5.5; 5.1 b. 5
c. The computations in part (a) show that as h approaches zero, the average velocity approaches the instantaneous velocity.

29. a. 130 ft/sec; 128.2 ft/sec; 128.02 ft/sec b. 128 ft/sec
c. The computations in part (a) show that as the time intervals over which the average velocity are computed become smaller and smaller, the average velocity approaches the instantaneous velocity of the car at $t = 20$.