Lesson 2.2.3

2-73. See below:

a. A sketch that resembles the graph of problem 2-74 at $x = 2$.

b. A sketch that resembles the graph of problem 2-74 at $x = 1$.

c. A sketch that resembles the graph of problem 2-74 at $x = –2$.

2-74. $x = –2$: cond. 3, $x = 0$: all cond., $x = 1$: cond. 1 and 3, $x = 2$: cond. 2 and 3

2-75. Since g(x) is continuous, it cannot "jump" the x-axis.

2-76.

1. $\lim_{x\to 0^-} |x| = \lim_{x\to 0^+} |x| = 0$ therefore $\lim_{x\to 0} |x|$ exists.
2. $|0| = 0$ by definition.
3. $\lim_{x\to 0} |x| = |0|$

2-77. See below:

a. true

b. Yes, the rate of the car as it slows is continuous; therefore, all intermediate values between 65 and 0 must occur.

2-79. $f(x)$ is not continuous.

2-80. At least 1.

2-81. See below:

a. 41 ft/sec; 46 ft/sec

b. The velocity is decreasing linearly.

c. The height function for the balloon can be modeled by a quadratic.

2-82. See below:

a. $\sum_{i=0}^{3} \frac{2}{3} f(-2 + \frac{2}{3} i)$

b. $\sum_{i=0}^{4} \frac{1}{2} f(6 + \frac{1}{2} i)$

2-83. Yes, the function is continuous and therefore cannot "jump" the x-axis.

2-84. See below:

a. $\sum_{i=0}^{2} 1 \cdot f(2 + i)$

b. $\sum_{i=0}^{8} \frac{1}{3} f(2 + \frac{1}{3} i)$

c. $\sum_{i=0}^{299} \frac{1}{100} f(2 + 0.01i)$

2-85. See below:

a. 10 rectangles

b. $-3 \le x \le 2$

c. ≈ 29.375 units^2

2-86. 3900 books; ≈ 557.143books/day

2-87. See below:

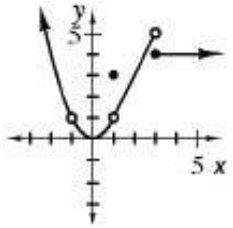
a. $\lim_{x \to 0} y = 9$

b. $\lim_{x \to 3} = \infty$

c. (a)

2-88. See below:

a. It will have holes at $x = -1$, 1 and jump discontinuity at $x = 3$; see graph below.



b. $x = -1$, 1, and 3