Lesson 3.2.1

3-35. See below:

a. m/sec

b. Each uses two different points to calculate the slope of a secant.

c. Each is the slope of a secant using two different points.

d. Yes, Hanah's slope is the average. Hana's method will not always give the best approximation—it depends on the concavity of the graph.

3-36. See below:

a. $\frac{0.25(2+h)^2-0.25(2)^2}{(2+h)-2}=1+\frac{1}{4}h$

b. Hana's

c. Take a limit as h approaches 0; $\lim\limits_{h\to 0}\left(1+\frac{1}{4}h\right)$

d. 1

e. No, the secant can approach the tangent from either side.

3-37. See below:

a. $\lim\limits_{h\to 0}\frac{\left[4-(1+h)^2\right]-\left[4-(1-h)^2\right]}{(1+h)-(1-h)}=-2$

b. –5

c. $g'(x) = 2x - 11$

3-38. $\frac{f(x+h)-f(x)}{h}$, $\frac{f(x)-f(x-h)}{h}$, $\frac{f(x+h)-f(x-h)}{2h}$

3-39. Anah's Method: $f'(x)=\lim\limits_{h\to 0}\frac{f(x)-f(x-h)}{h}$, Hanah's Method:

$f'(x)=\lim\limits_{h\to 0}\frac{f(x+h)-f(x-h)}{2h}$

3-40. $f'(x) = 8x$; 88; 8000

3-41. See below:

a. $f(x) = 2x^3$

b. $f'(x) = 6x^2$

Review & Preview

3-42. See below:

a. $x^{1/2}$

b. x^{-3}

c. $x^{-1/2}$

d. $x^{5/3}$

3-43. $A = -\frac{4}{15} \approx -0.273$

3-44. See below:

a. $\frac{5}{3}$

b. 3

c. 1

d. DNE

3-45. $f'(x) = 4x$; $f(x) = 2x^2$

3-46. 16 units^2

3-47. See below:

a. There is not enough information.

b. $v(6) \approx 11.33$ m/sec

c. $v(6) \approx 10.171$ m/sec; $v(10) \approx 16.482$ m/sec

3-48. The slope is extremely large and positive, decreasing to zero, then abruptly becomes very negative and increases to zero, then becomes positive.

3-49. Answers will vary with regards to range of approximation, about $y = 2x - 0.571$.

3-50. (Order of events: 4, 3, 2, and 1)

a. miles per hour

b. $m = 0$

c. The slope is large, and then goes to zero.

d. He is traveling towards home.

3-51. See below:

a. DNE, but $y \to -\infty$

b. 7

c. -1

d. π