Lesson 3.2.2

3-52. $f'(x) = 2x + 4$

3-53. Yes: $x^0 = 1 = 1$, so $f'(x) = 0x^{-1} = 0$; students should also test functions such as $f(x) = x^{1/2}$ and $f(x) = x^{-3}$

3-54. $f'(x) = 6x^2 - 6x + 4$; $y - 33 = 40(x - 3)$

3-55. See below:

a. $f(x) = x^2 - 1$

b. $a = 9$

c. $f'(x) = 2x$

d. $f'(9) = 18$

e. $y - 80 = 18(x - 9)$

3-56. See below:

a. yes

b. Impossible! Ana's method will only find the derivative at a point, not a derivative function.

c. She does not have an "h" in her name, or her definition!

3-57. See below:

a. The Power Rule only applies when there is a variable raised to an exponent.

b. ≈ 1.390

c. $y = 1.390x - 0.274$

3-58. Graph A: velocity; Graph B: distance

3-59. See below:

a. $\frac{dv}{dt}$

b. $\frac{dV}{dr}$

c. $\frac{dA}{dp}$

3-60. See below:

a. $-9x^{-2}$

b. $-21x^6 - 6$

c. $-20t^{-5}$

d. 1

3-61. Answers vary, but the function must be odd with horizontal asymptotes at $y = \pm 4$.

3-62. See below:

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

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

c. 0, 2

3-63. See below:

a. Answers vary.

b. Zero velocity: the runner is momentarily stopped.

c. Area A is the forward distance that the runner travels; area B is the distance that is run in the reverse direction.

d. $A + B$ is the total displacement of the runner; B is negative because the area is located under the horizontal axis and the distance traveled is in the reverse direction.

3-65. Answers vary; Possible solution: $y = \frac{2x^3}{x(x+3)(x-5)}$

3-66. See below:

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

b. $\frac{1}{3}$

c. $\frac{1}{6}$

d. $\frac{7}{3}$

3-67. See below:

a. $\sin x \cos y + \cos x \sin y$

b. $\cos x \cos y - \sin x \sin y$

c. $\sin x \cos y - \cos x \sin y$

d. $\cos x \cos y + \sin x \sin y$