Section 3.5

1. A ball is thrown up from the ground level has a position function of $s(t) = -16t^2 + 144t$

   (a) When will the ball be at 128 feet? $(128 = 16 \cdot 8)$

   (b) When is the ball at its highest point?

   (c) How fast is the ball traveling when it hits the ground?

Section 3.6

2. Find the derivatives

   (a) $y = (3x^2 - 2)^8$

   (b) $y = t^3(t^4 + 5)^{7/2}$

   (c) $y = (e^{2x+1} - 2)^4$

   (d) $y = \sqrt{\frac{\sin(x)}{\sin(3x)}}$

   (e) $y = \cos(9x^{18})$

   (f) $y = \sec(e^{3x^2-7})$

Section 3.7

3. Find the derivatives using implicit differentiation

   (a) $4\sqrt{x} - 8\sqrt{y} = 6y^{3/2}$

   (b) $(xy)^{4/3} + x^{1/3} = y^6 + 1$

4. Find the equation of the tangent line at the given x or point

   (a) $2y^2 - \sqrt{x} = 4; \quad (16, 2)$

   (b) $y^4(1 - x) + xy = 2; \quad x = 1$

Section 3.8

5. Find the derivatives

   (a) $y = \log_3(x^2 + 2x)^{3/2}$

   (b) $y = (3x + 7)\ln(6x - 11)$

   (c) $y = (\ln|x + 1|)^4$

   (d) $y = 10^x \log(x)$

   (e) $y = 5^{8x-3}$

   (f) $y = -10^{3x^2-4}$

Section 3.9

6. Find the derivatives

   (a) $f(x) = \tan^{-1}\left(\sqrt[3]{x}\right)$

   (b) $f(x) = \frac{x}{\tan^{-1}(10^x)}$

   (c) $f(x) = \left(\sin^{-1}\left(\sqrt{x - 1}\right)\right)^4$

   (d) $f(x) = \frac{x \sec^{-1}(3x)}{e^{2x}}$

Back page for Section 3.10

Section 3.10

7. Find the derivatives

   (a) A small rock is dropped into a lake. Circular ripples spread over the surface of the water with the radius of each circle increasing at a rate of 3/2 ft/s. Find the rate of change of a circular ripple when the radius is $r = 4$.

   (b) A 50 foot ladder is placed against a large building. The base of a ladder is sliding away from the building at a rate of 3 ft/min. Find the rate of change of the height of the top of the ladder above the ground when the base of the ladder is 30 feet from the building.