Section 3.7
38. \( y' = 2x(\cos^2(x^2) - \sin^2(x^2)) \)  
80. 7  
82. 28

Section 3.8
26. \( y' = \frac{2x - ye^{xy}}{xe^{xy} - 2y} \)  
30. \( y = -\frac{1}{14}x + \frac{8}{7} \)

Section 3.9
26. \( y' = \frac{x}{1 + x^2} + \tan^{-1}x \)  
28. \( y' = \frac{e^x}{\sqrt{1 - e^{2x}}} \)

Section 3.10
16. \( y' = \frac{1}{x + 1} - \frac{3x^2}{x^3 + 1} \)  
32. \( y = x - \frac{\pi}{4} + \ln\left(\frac{\sqrt{2}}{2}\right) \)  
36. \( y' = x\cos x \left(\frac{\cos x}{x} - \sin x \ln x\right) \)

Section 3.11
6. \( \frac{dV}{dt} = 43,904\pi \text{ in}^3/\text{min} \)  
20. \( y = \frac{12}{\sqrt{t}} \text{ ft/sec} \)  
35.* a) \( \frac{dy}{dt} = 36 \text{ ft/sec} \)  
b) \( \frac{dl}{dt} = \frac{198}{\sqrt{29}} \text{ ft/sec} \)

Chapter 3 Review Exercises
60. \( g'(t) = (4 - 2t)e^{4t-t^2} \)  
122. \( y' = \frac{e^{3x}(x-2)^2}{(x+1)^2} \left(3 + \frac{2}{x-2} - \frac{2}{x+1}\right) \)

Section 4.2
32. Absolute minimum is \(-3\) at \(x = -1\); absolute maximum is \(4\) at \(x = 2\)

48. Absolute minimum is \(-\sqrt{2}\) at \(x = \frac{5\pi}{4}\); absolute maximum is \(\sqrt{2}\) at \(x = \frac{\pi}{4}\).

52. Absolute minimum is \(0\) at \(x = 0\); absolute maximum is \(\frac{1}{e}\) at \(x = 1\)

Section 4.3
24. \( x = 1 \) is a critical point, \(f(1)\) is neither a local maximum nor local minimum; \(x = 0.5\) is a critical point, \(f(0.5)\) is a local maximum; \(x = 2\) is a critical point, \(f(2)\) is a local minimum

Section 4.4
42. \( f \) is concave up on \((-\sqrt{6}, 0) \cup (\sqrt{6}, \infty)\); concave down on \((-\infty, -\sqrt{6}) \cup (0, \sqrt{6})\); points of inflection at \(x = -\sqrt{6}, x = 0\), and \(x = \sqrt{6}\);
local minimum at critical point \(x = -\sqrt{2}\); local maximum at critical point \(x = \sqrt{2}\)
Section 4.5

4. Answers vary. Graph must be increasing and concave down at first, and then change to decreasing and concave down (so has a local max), and then changes to decreasing and concave up (so has an inflection point).

52. $\frac{3}{4}$

58. 0

Section 4.7

12. 0

36. 2

38. 2

Chapter 4 Review Problems

20. \( f \) is continuous and differentiable on \([1, 4]\) so the MVT applies; \( c = \frac{3}{\ln 4} \)

26. Local minimum at critical point \( x = 0 \); local maximum at critical point \( x = \frac{2}{5} \)

44. Pictures vary. On \(( -\infty, -2)\) graph is decreasing and concave up; on \(( -2, 1)\) it is decreasing and concave down (so point of inflection at \( x = -2 \)); on \((1, 3)\) it is decreasing and concave up (so point of inflection at \( x = 1 \)); on \((3, 5)\) the graph is increasing and concave up (so local minimum at \( x = 3 \)), and on \((5, \infty)\) the graph is increasing and concave down (so another point of inflection at \( x = 5 \))