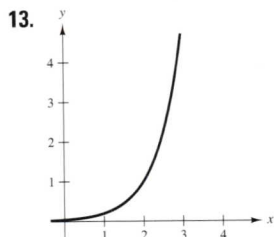
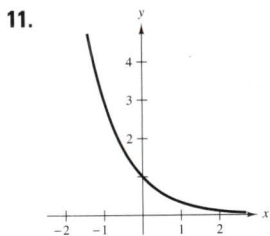
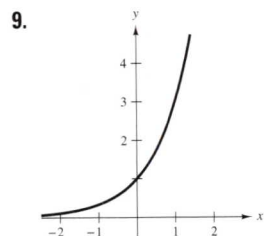
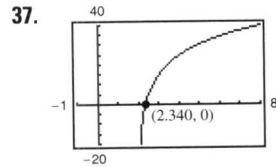
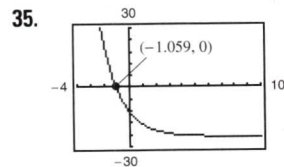


Section 5.5 (page 368)

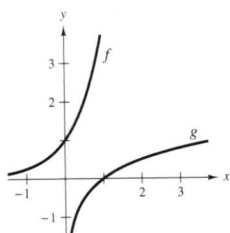
1. -3 3. 0 5. (a) $\log_2 8 = 3$ (b) $\log_3(1/3) = -1$
7. (a) $10^{-2} = 0.01$ (b) $\left(\frac{1}{2}\right)^{-3} = 8$



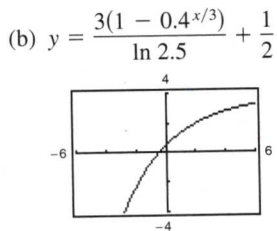
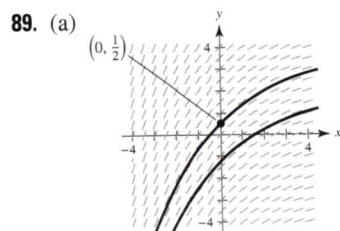
19. (a) $x = 3$ (b) $x = -1$ 21. (a) $x = \frac{1}{3}$ (b) $x = \frac{1}{16}$
 23. (a) $x = -1, 2$ (b) $x = \frac{1}{3}$ 25. 1.965 27. -6.288
 29. 12.253 31. 33.000 33. ± 11.845



35. (-1.059, 0) 37. (2.340, 0)
 39. 41. $(\ln 4)4^x$ 43. $(-4 \ln 5)5^{-4x}$



45. $9^x(x \ln 9 + 1)$ 47. $t2^t(t \ln 2 + 2)$
 49. $-2^{-\theta}[(\ln 2) \cos \pi\theta + \pi \sin \pi\theta]$
 51. $5/[(\ln 4)(5x + 1)]$ 53. $2/[(\ln 5)(t - 4)]$
 55. $x/[(\ln 5)(x^2 - 1)]$ 57. $(x - 2)/[(\ln 2)x(x - 1)]$
 59. $(3x - 2)/[(2x \ln 3)(x - 1)]$
 61. $5(1 - \ln t)/(t^2 \ln 2)$ 63. $y = -2x \ln 2 - 2 \ln 2 + 2$
 65. $y = [1/(27 \ln 3)]x + 3 - 1/\ln 3$ 67. $2(1 - \ln x)x^{(2/x)-2}$
 69. $(x - 2)^{x+1}[(x + 1)/(x - 2) + \ln(x - 2)]$
 71. $y = x$ 73. $y = \frac{\cos e}{e}x - \cos e + 1$ 75. $3^x/\ln 3 + C$
 77. $\frac{1}{3}x^3 - \frac{2^{-x}}{\ln 2} + C$ 79. $[-1/(2 \ln 5)](5^{-x^2}) + C$
 81. $\ln(3^{2x} + 1)/(2 \ln 3) + C$ 83. $7/(2 \ln 2)$
 85. $4/\ln 5 - 2/\ln 3$ 87. $26/\ln 3$



91. (a) $x > 0$ (b) 10^x (c) $3 \leq f(x) \leq 4$
 (d) $0 < x < 1$ (e) 10 (f) 100^x
 93. (a) ax^{a-1} (b) $(\ln a)a^x$ (c) $x^x(1 + \ln x)$ (d) 0
 95. (a) \$40.64 (b) $C'(1) \approx 0.051P$, $C'(8) \approx 0.072P$
 (c) $\ln 1.05$

n	1	2	4	12
A	\$1410.60	\$1414.78	\$1416.91	\$1418.34

n	365	Continuous
A	\$1419.04	\$1419.07

n	1	2	4	12
A	\$4321.94	\$4399.79	\$4440.21	\$4467.74

n	365	Continuous
A	\$4481.23	\$4481.69

t	1	10	20	30
P	\$95,122.94	\$60,653.07	\$36,787.94	\$22,313.02

t	40	50
P	\$13,533.53	\$8208.50

t	1	10	20	30
P	\$95,132.82	\$60,716.10	\$36,864.45	\$22,382.66

t	40	50
P	\$13,589.88	\$8251.24

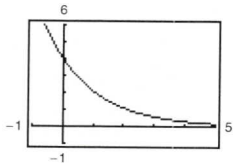
105. c
 107. (a) 6.7 million ft^3/acre
 (b) $t = 20$: $\frac{dV}{dt} = 0.073$; $t = 60$: $\frac{dV}{dt} = 0.040$

109. (a) (b) 16.7%
 (c) $x \approx 38.8$ or 38,800 egg masses
 (d) $x \approx 27.75$ or 27,750 egg masses

111. (a) $B = 4.75(6.774)^d$
 (b) (c) When $d = 0.8$, the rate of growth is 41.99.
 When $d = 1.5$, the rate of growth is 160.21.

113. (a) 5.67; 5.67; 5.67

(b)



(c) $f(t) = g(t) = h(t)$. No, because the definite integrals of two functions over a given interval may be equal even though the functions are not equal.

115. $y = 1200(0.6^t)$ 117. e 119. e^2

121. False: e is an irrational number. 123. True 125. True

127. (a) $(2^3)^2 = 2^6 = 64$

$$2^{(3^2)} = 2^9 = 512$$

(b) No. $f(x) = (x^x)^x = x^{(x^2)}$ and $g(x) = x^{(x^x)}$

(c) $f'(x) = x^{x^2}(x + 2x \ln x)$

$$g'(x) = x^{x^x+x-1}[x(\ln x)^2 + x \ln x + 1]$$

129. Proof

131. (a) $\frac{dy}{dx} = \frac{y^2 - yx \ln y}{x^2 - xy \ln x}$

(b) (i) 1 when $c \neq 0, c \neq e$ (ii) -3.1774 (iii) -0.3147

(c) (e, e)

133. Putnam Problem A15, 1940