

103. $\frac{3x^4}{2y^3}, x \neq 0$ 105. $1, x \neq 0, y \neq 0$

107. $-1, \frac{1}{3}$ 109. $\frac{-1 \pm \sqrt{97}}{6}$

Section 3.4 (page 253)

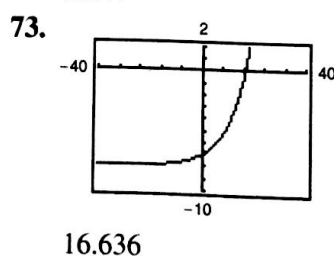
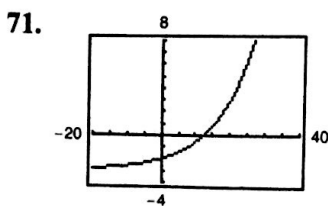
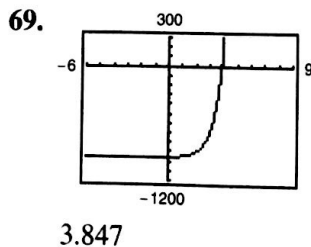
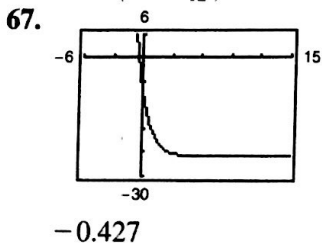
Vocabulary Check (page 253)

1. solve
2. (a) $x = y$ (b) $x = y$ (c) x (d) x
3. extraneous

1. (a) Yes (b) No
3. (a) No (b) Yes (c) Yes, approximate
5. (a) Yes, approximate (b) No (c) Yes
7. (a) No (b) Yes (c) Yes, approximate
9. 2 11. -5 13. 2 15. $\ln 2 \approx 0.693$
17. $e^{-1} \approx 0.368$ 19. 64 21. (3, 8) 23. (9, 2)
25. 2, -1 27. $\approx 1.618, \approx -0.618$
29. $\frac{\ln 5}{\ln 3} \approx 1.465$ 31. $\ln 5 \approx 1.609$ 33. $\ln 28 \approx 3.332$
35. $\frac{\ln 80}{2 \ln 3} \approx 1.994$ 37. 2 39. 4
41. $3 - \frac{\ln 565}{\ln 2} \approx -6.142$ 43. $\frac{1}{3} \log\left(\frac{3}{2}\right) \approx 0.059$
45. $1 + \frac{\ln 7}{\ln 5} \approx 2.209$ 47. $\frac{\ln 12}{3} \approx 0.828$
49. $-\ln \frac{3}{5} \approx 0.511$ 51. 0 53. $\frac{\ln \frac{8}{3}}{3 \ln 2} + \frac{1}{3} \approx 0.805$
55. $\ln 5 \approx 1.609$ 57. $\ln 4 \approx 1.386$
59. $2 \ln 75 \approx 8.635$ 61. $\frac{1}{2} \ln 1498 \approx 3.656$

63. $\frac{\ln 4}{365 \ln\left(1 + \frac{0.065}{365}\right)} \approx 21.330$

65. $\frac{\ln 2}{12 \ln\left(1 + \frac{0.10}{12}\right)} \approx 6.960$



75. $e^{-3} \approx 0.050$ 77. $\frac{e^{2.4}}{2} \approx 5.512$ 79. 1,000,000

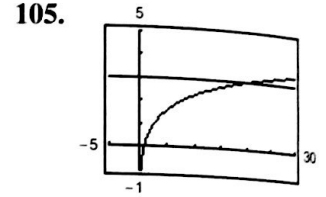
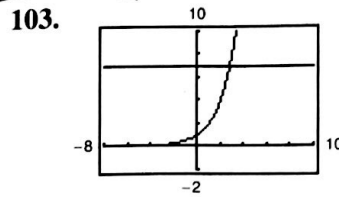
81. $\frac{e^{10/3}}{5} \approx 5.606$ 83. $e^2 - 2 \approx 5.389$

85. $e^{-2/3} \approx 0.513$ 87. $2(3^{11/6}) \approx 14.988$

89. No solution 91. $1 + \sqrt{1 + e} \approx 2.928$

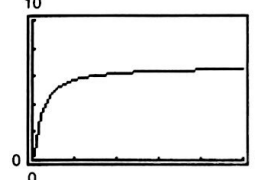
93. No solution 95. 7 97. $\frac{-1 + \sqrt{17}}{2} \approx 1.562$

99. 2 101. $\frac{725 + 125\sqrt{33}}{8} \approx 180.384$



107. (a) 8.2 years (b) 12.9 years

109. (a) 1426 units (b) 1498 units

111. (a)  (b) $V = 6.7$; The yield will approach 6.7 million cubic feet per acre. (c) 29.3 years

113. 2001

115. (a) $y = 100$ and $y = 0$; The range falls between 0% and 100%.

(b) Males: 69.71 inches Females: 64.51 inches

117. (a)

| | | | | | |
|---|-------|------|------|------|------|
| x | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 |
| y | 162.6 | 78.5 | 52.5 | 40.5 | 33.9 |

(b)  The model appears to fit the data well.

(c) 1.2 meters

(d) No. According to the model, when the number of g 's is less than 23, x is between 2.276 meters and 4.404 meters, which isn't realistic in most vehicles.

119. $\log_b uv = \log_b u + \log_b v$

True by Property 1 in Section 5.3.

121. $\log_b(u - v) = \log_b u - \log_b v$

False.

$1.95 \approx \log(100 - 10) \neq \log 100 - \log 10 = 1$

123. Yes. See Exercise 93.

125. Yes. Time to double: $t = \frac{\ln 2}{r}$;

Time to quadruple: $t = \frac{\ln 4}{r} = 2\left(\frac{\ln 2}{r}\right)$