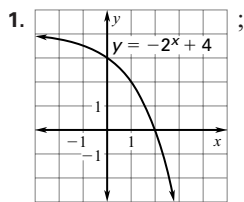
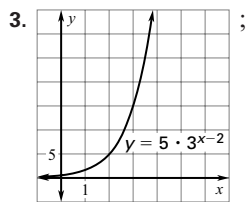


**CHAPTER 8 REVIEW** (pp. 524–526)

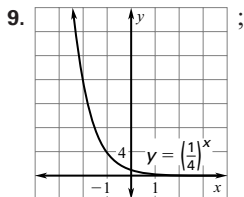


domain: all real numbers;  
range:  $y < 4$

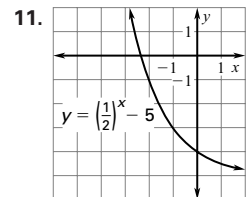


domain: all real numbers;  
range:  $y > 0$

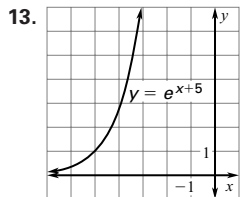
5. exponential decay 7. exponential decay



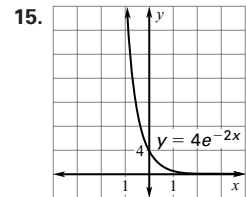
domain: all real numbers;  
range:  $y > 0$



domain: all real numbers;  
range:  $y > -5$

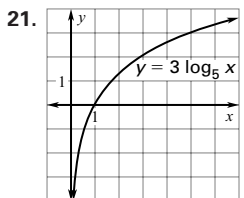


domain: all real numbers;  
range:  $y > 0$

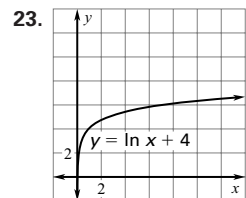


domain: all real numbers;  
range:  $y > 0$

17. 3 19. -2



domain:  $x > 0$ ;  
range: all real numbers



domain:  $x > 0$ ;  
range: all real numbers

25.  $\log_3 6 + \log_3 x + \log_3 y$  27.  $\log 5 + 3 \log x$

29.  $\ln \frac{9}{5}$  31.  $\log 18$  33. -1.466 35. 160.49

37.  $y = 3.9605(1.499)^x$  39.  $y = 2.099x^{0.696}$

41.  $y = 3.188x^{1.673}$

43.

asymptotes:  $x$ -axis and  $y = 4$ ;  
 $y$ -intercept:  $\frac{4}{3}$ ; pt of max growth: (0.231, 2)

**CHAPTER 9**

**SKILL REVIEW** (p. 532) 1.  $y = \frac{5}{2}x$  2.  $y = \frac{1}{10}x$

3.  $y = -\frac{1}{4}x$  4.  $y = -4x$  5.  $15x - 5$  6.  $x^3 + 7x^2 + 8x - 16$

7.  $-x^3 + 5x$  8.  $x^3 + 7x^2 - 8x$  9.  $(x - 3)^2$   
10.  $4(x - 1)(x^2 + x + 1)$  11.  $2x(2x - 9)(2x + 9)$   
12.  $(2x - 1)(3x + 5)$  13. 0, -2 14. -5, 3 15. -1, 4

**9.1 PRACTICE** (pp. 537–539) 5. direct variation 7. inverse variation 9. inverse variation 11. neither 13. yes 15. yes 17. yes 19. yes 21. inverse variation 23. neither

25. inverse variation 27. direct variation 29.  $y = -\frac{10}{x}$ ; -5

31.  $y = \frac{7}{x}$ ; 3.5 33.  $y = -\frac{4}{x}$ ; -2 35. inverse variation

37. neither 39.  $z = \frac{1}{4}xy$ ; -7 41.  $z = 15xy$ ; -420

43.  $z = 32xy$ ; -896 45.  $x = \frac{kz}{y}$  47.  $w = \frac{kzy}{x}$

49. yes;  $l = \frac{45\pi}{8A}$  51.  $D = \frac{k\sqrt{L}}{T^2}$  53. 139,000,000 km

55.  $W = \frac{49}{5}mh$ ; 1470 joules 57. 285 watts

**9.1 MIXED REVIEW** (p. 539)

61. domain: all real numbers  $x$  such that  $x \geq -2$ ; range: all real numbers  $y$  such that  $y \geq 0$

63. domain: all real numbers  $x$  such that  $x \geq 1$ ; range: all real numbers  $y$  such that  $y \geq 0$

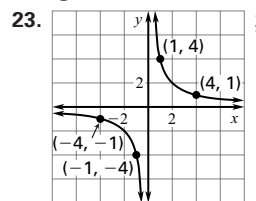
65. 128 67. 113 69. 7

**9.2 PRACTICE** (pp. 543–545) 5.  $y = 2$ ;  $x = -4$  7.  $y = \frac{1}{2}$ ;  $x = 2$

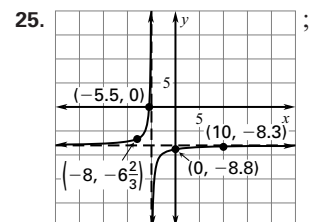
9.  $y = -5$ ;  $x = 6$  11.  $y = 2$ ;  $x = 0$ ; domain: all real numbers except 0; range: all real numbers except 2 13.  $y = -2$ ;

$x = -3$ ; domain: all real numbers except -3; range: all real numbers except -2 15.  $y = \frac{2}{3}$ ;  $x = -\frac{1}{3}$ ; domain: all real numbers except  $-\frac{1}{3}$ ; range: all real numbers except  $\frac{2}{3}$

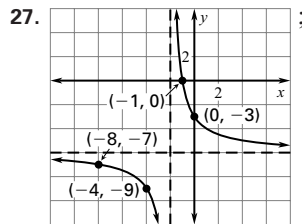
17.  $y = -17$ ;  $x = -43$ ; domain: all real numbers except -43; range: all real numbers except -17 19.  $y = 19$ ;  $x = 6$ ; domain: all real numbers except 6; range: all real numbers except 19 21. C



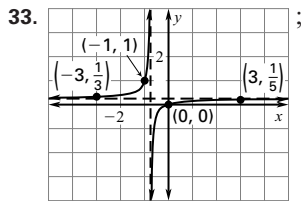
domain: all real numbers except 0; range: all real numbers except 0



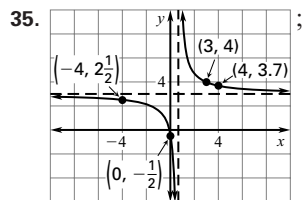
domain: all real numbers except -5; range: all real numbers except -8



domain: all real numbers except  $-2$ ; range: all real numbers except  $-6$

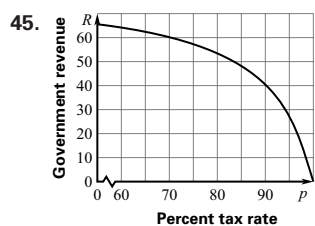


domain: all real numbers except  $-\frac{3}{4}$ ; range: all real numbers except  $\frac{1}{4}$



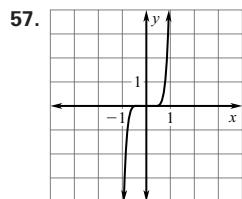
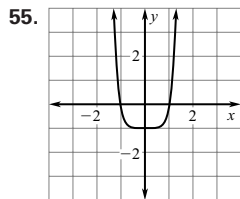
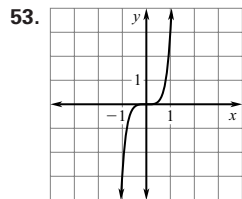
domain: all real numbers except  $\frac{2}{3}$ ; range: all real numbers except 3

41. Sample answer:  
 $y = \frac{1}{x+4} + 3$  43. 30



47.  $f = \frac{1,480,000}{740 - r}$

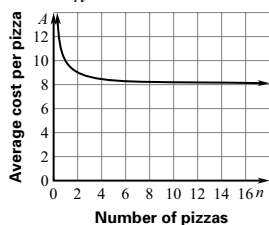
9.2 MIXED REVIEW (p. 545)



- 59.  $(2x - 5)(4x^2 + 10x + 25)$
- 61.  $(x + 3)(x^2 + 3)$
- 63.  $(3x - 1)(3x + 1)(9x^2 + 1)$
- 65.  $\frac{1}{5}e^{x-1}$  67.  $e^{5x+1}$
- 69.  $e^{4-x}$

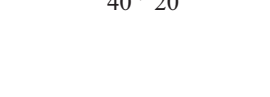
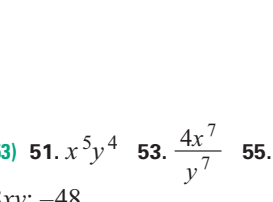
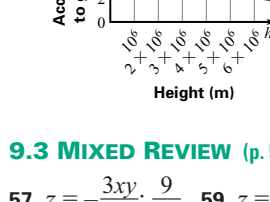
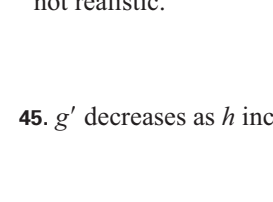
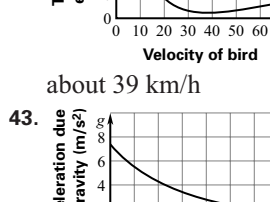
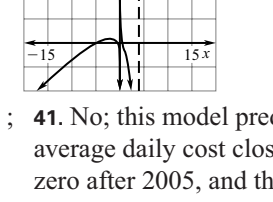
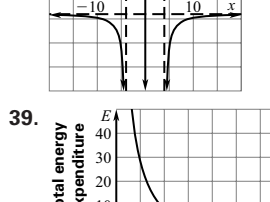
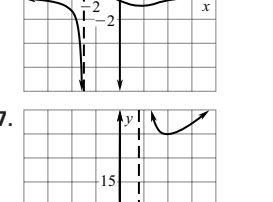
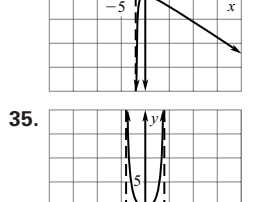
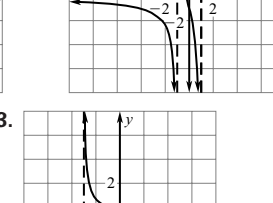
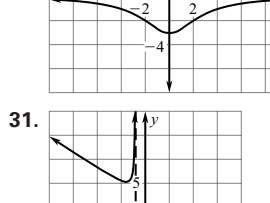
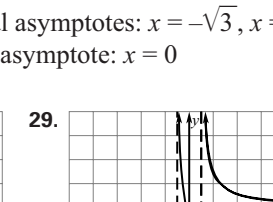
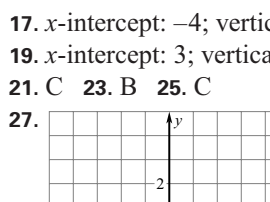
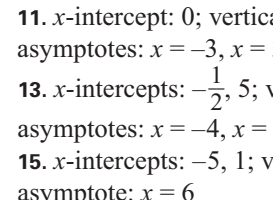
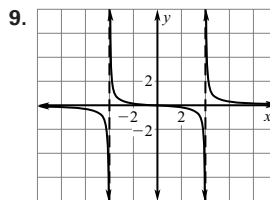
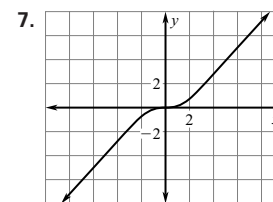
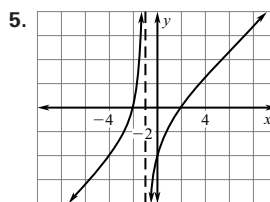
TECHNOLOGY ACTIVITY 9.2 (p. 546)

7.  $A = \frac{2 + 8n}{n}$



The average cost approaches \$8.

9.3 PRACTICE (pp. 550–552)



9.3 MIXED REVIEW (p. 553)

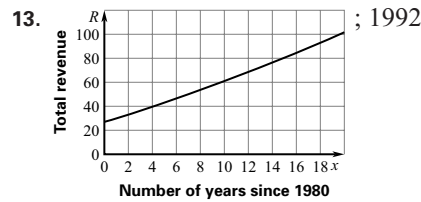
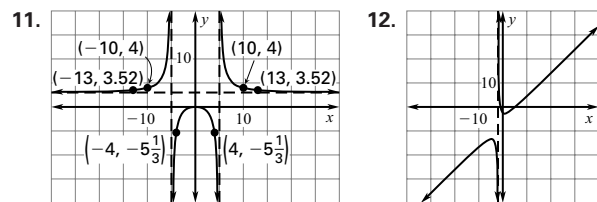
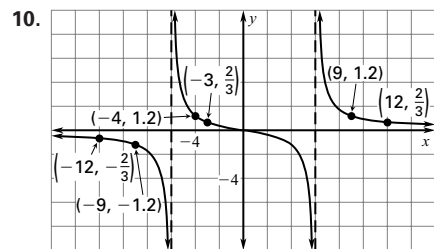
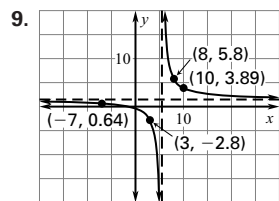
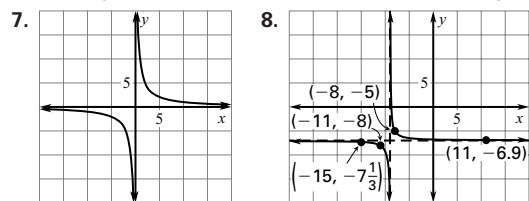
- 51.  $x^5y^4$  53.  $\frac{4x^7}{y^7}$  55.  $\frac{x^6}{125y^6}$
- 57.  $z = -\frac{3xy}{40}, \frac{9}{20}$  59.  $z = 8xy; -48$

SELECTED ANSWERS

61.  $f(g(x)) = f\left(-\frac{1}{3}x + \frac{2}{3}\right) = -3\left(-\frac{1}{3}x + \frac{2}{3}\right) + 2 = x - 2 + 2 = x$ ;  $g(f(x)) = g(-3x + 2) = -\frac{1}{3}(-3x + 2) + \frac{2}{3} = x - \frac{2}{3} + \frac{2}{3} = x$

63.  $f(g(x)) = f\left(\frac{\sqrt[4]{x}}{2}\right) = 16\left(\frac{\sqrt[4]{x}}{2}\right)^4 = 16\left(\frac{x}{16}\right) = x$ ;  
 $g(f(x)) = g(16x^4) = \frac{\sqrt[4]{16x^4}}{2} = \frac{2x}{2} = x$

**QUIZ 1 (p. 553)** 1.  $y = -\frac{12}{x}$ ; 4 2.  $y = \frac{66}{x}$ ; -22 3.  $y = \frac{6}{x}$ ; -2  
 4.  $x = -\frac{yz}{6}$ ; -24 5.  $x = 4yz$ ; 1 6.  $x = -\frac{5yz}{4}$ ;  $-\frac{16}{5}$



**9.4 PRACTICE (p. 558-560)** 3.  $\frac{x}{x^2 + 3}$  5. not possible  
 7. not possible 9.  $\frac{x^5}{25y^2}$  11.  $\frac{x-2}{x^2}$  13.  $\frac{6y^3}{x^5}$   
 15. with: 6.9; without: 9.3 17. not possible  
 19. not possible 21.  $\frac{3(x+1)}{x+2}$  23.  $\frac{x-3}{x}$  25. not possible

27.  $\frac{x^2-2}{x^2-3x+9}$  29.  $\frac{16x^3}{y^2}$  31.  $\frac{3(x+4)}{x+3}$  33.  $2(x-1)(x-3)$   
 35.  $\frac{-(x+1)^2}{x^2}$  37.  $\frac{1}{y^2}$  39.  $\frac{1}{3x}$  41.  $\frac{(x+4)(x-2)}{x+2}$   
 43.  $\frac{(x-3)(x+5)}{3x}$  45.  $\frac{(x-4)(x+2)}{4x^2}$  47.  $9(x+3)$   
 49.  $3(x+2)$  51.  $H = \frac{k_2}{k_1V^2}$  or  $HV^2$  is a constant. A shorter

runner can run faster than a taller runner and still have the heat being generated equal the heat being released, so a shorter runner has an advantage. 53. 468.5 acres  
 55. about \$4,400 million

**9.4 MIXED REVIEW (p. 560)** 61. 15; 1320 63. 12; 504  
 65. 120; 2400 67.  $x^2 + 6x - 7$  69.  $x^3 + 6x^2 + 11x + 6$   
 71.  $-6x^6 + 24x^4 + 5x^3 - 20x$   
 73.

**TECHNOLOGY ACTIVITY 9.4 (p. 561)**

1.  $\frac{x}{x+4}$  3.  $\frac{x-2}{x+1}$  5.  $\frac{2x}{3}$

**9.5 PRACTICE (pp. 565-567)**

5.  $\frac{2x+7}{x+5}$  7.  $\frac{x^2-3x+24}{(x-4)(x+3)}$  9.  $\frac{x(x-23)}{20(2x+1)}$   
 11.  $\frac{Pi}{1 - \left(\frac{1}{1+i}\right)^{12t}} = \frac{Pi(1+i)^{12t}}{\left(1 - \left(\frac{1}{(1+i)^{12t}}\right)\right)(1+i)^{12t}} = \frac{Pi(1+i)^{12t}}{(1+i)^{12t} - 1}$   
 13.  $\frac{23-x}{10x^2}$  15.  $\frac{5x(x+1)}{x+8}$  17.  $\frac{1}{x}$  19.  $21x^2(x-5)$   
 21.  $x(x+3)(x-6)$  23.  $(x-7)(x+2)(x+4)$  25. Always; each denominator must be a factor of the LCD, so the LCD must have degree greater than or equal to each of the separate denominators. 27.  $\frac{-47}{21x}$  29.  $\frac{10x+13}{(x-3)(x+3)}$   
 31.  $\frac{11-x}{(x-2)(x+4)}$  33.  $\frac{-3(5x^2+x+2)}{(x-10)(3x+2)}$  35.  $\frac{2(x^2-5x-8)}{(x-4)(x+4)^2}$   
 37.  $\frac{49x^2+24x-5}{6x(x-1)(x+1)}$  39.  $\frac{80}{x-27}$  41.  $\frac{-(x^3-x-1)}{3(x+1)}$  43.  $\frac{-2}{3x}$   
 45.  $\frac{3x(x-4)}{(13x+8)(x^2-4x+16)}$   
 47.  $M = \frac{357t^3 + 5500t^2 - 37,100t + 485,000}{(0.00418t^2 + 1)(-0.0580t + 1)}$   
 49.  $A = \frac{391(t-1)^2 + 0.112}{0.218(t-1)^4 + 0.991(t-1)^2 + 1}$   
 51. about 1.2 hours after the second dose 53.  $\frac{24}{7}$  ohms  
**9.5 MIXED REVIEW (p. 567)** 57. 24 59.  $\frac{16}{3}$  61. -66  
 63.  $-\frac{102}{23}$  65. 72 67.  $\pm 2\sqrt{5}$  69. 2, 8 71. -7,  $\frac{1}{2}$

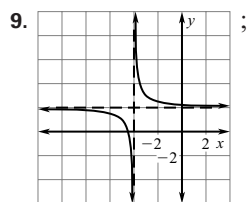
- 9.6 PRACTICE (pp. 571–573)** 5.  $-\frac{8}{3}$  7.  $\frac{3}{2}$  9.  $-5$  11.  $-15, 0$   
 13.  $0$  15. no 17. no 19. yes 21.  $2$  23.  $-1, \frac{1}{4}$  25.  $-\frac{2}{3}, 2$   
 27.  $-\frac{3}{2}, 2$  29.  $\frac{5}{7}, 3$  31.  $-3$  33.  $\frac{6}{17}$  35.  $-4, 4$  37.  $2, 5$   
 39.  $4$  41.  $-\frac{3}{2}, 5$  43.  $-5$  45. no solution 47.  $-2, 0$  49.  $2, 6$   
 51. Always; when you solve by cross multiplying, you get  $x = 1$  or  $x = a$  and  $x = a$  makes both fractions undefined.  
 53. Always; when you multiply each side of the equation by  $x^2 - a^2$ , you get  $x = a$ , making the fractions undefined.  
 55.  $87$  57. about  $2198$  flies/m<sup>3</sup> 59.  $\$16.50$

- 9.6 MIXED REVIEW (p. 573)** 63.  $1; -1$  65.  $-\frac{2}{3}; \frac{3}{2}$  67.  $\frac{1}{2}; -2$   
 69.  $4\sqrt{3}$  71.  $6\sqrt{3}$  73.  $3\sqrt{30}$  75.  $15$  77.  $6.796$

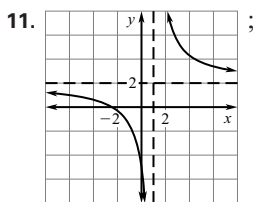
- QUIZ 2 (p. 574)** 1.  $\frac{5x^5y}{3}$  2.  $\frac{x-8}{5x}$  3.  $\frac{2x^2}{(x-9)(x+4)}$   
 4.  $\frac{16x^2-5x+6}{2(5x-6)(5x+6)}$  5.  $\frac{-6(11x+8)}{6x-1}$  6.  $-6$   
 7.  $\frac{-3(x-3)(2x-1)(2x+1)}{(x-1)(x+1)}$  8.  $\frac{2x}{(x-5)(x+1)}$  9. 20 dozen

**CHAPTER 9 REVIEW (pp. 576–578)**

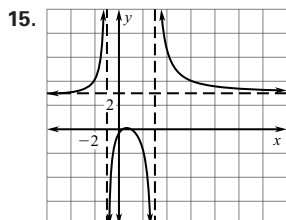
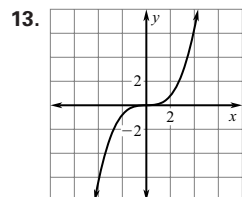
1.  $y = \frac{5}{x}; 2.5$  3.  $y = \frac{2}{x}; 1$  5.  $z = \frac{1}{3}xy; -10$  7.  $z = 3xy; -90$



domain: all real numbers; except  $-4$ ; range: all real numbers except  $2$



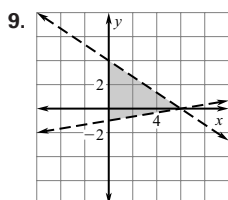
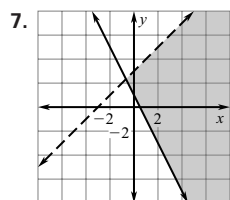
domain: all real numbers; except  $1$ ; range: all real numbers except  $2$



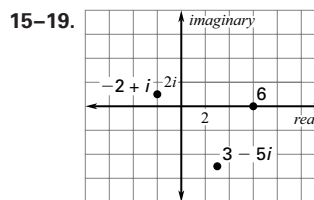
17.  $5(x-6)(x+3)(x-3)$  19.  $\frac{x^3+5}{x^2(x-2)}$   
 21.  $\frac{-9x^2+18x-10}{5x(x-1)(x+5)}$  23.  $\frac{x(x-8)}{2(9x+2)}$  25.  $\frac{12}{5}$   
 27.  $\frac{3}{2}$  29. no solution 31.  $-4, 1$

**CUMULATIVE PRACTICE (pp. 582–583)**

1.  $y = 3x - \frac{7}{2}$  3.  $y = -\frac{5}{6}x + 25$  5. parallel

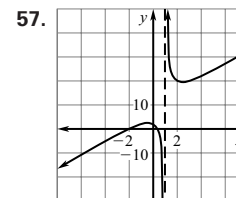
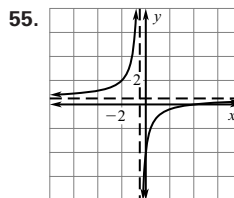
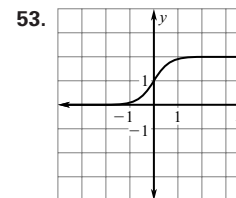
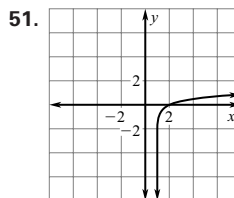
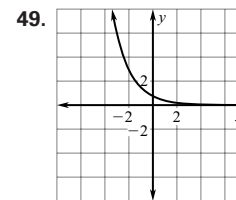
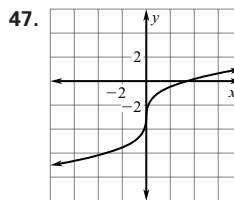


11.  $\begin{bmatrix} 12 & -2 \\ -12 & 2 \end{bmatrix}$  13.  $\begin{bmatrix} -2 & -8 \\ 17 & 30 \end{bmatrix}$



15.  $\sqrt{5}$  17.  $6$  19.  $\sqrt{34}$   
 21.  $5$  23.  $\frac{3x^4}{10}$   
 25.  $2ab\sqrt[4]{bc}$  27.  $\frac{1}{8e^6}$   
 29.  $2$  31.  $\frac{1}{5}$  33.  $\frac{1}{2}$

35.  $-x^2 + 2x + 13$ ; all real numbers  
 37.  $-2x^2 - 15$ ; all real numbers 39.  $f^{-1}(x) = 2(x+6)$   
 41.  $f^{-1}(x) = 5^x$  43.  $\log(3x^2y^3)$  45.  $\ln(x^2y^2)$



59.  $10$  61.  $-\frac{9\sqrt{3}}{2}$  63.  $\ln 8 \approx 2.079$  65.  $-\frac{9}{5}$   
 67.  $y = \frac{5}{32}(2)^x$  69.  $y = 0.759(1.737)^x$  71.  $y = 1.651x^{0.861}$   
 73.  $y = 1.704x^{0.231}$  75.  $\frac{6x^3 + 7x^2 - 20x - 9}{2x(x-1)(3x+1)}$   
 77. about  $3.5$  sec 81.  $f = \frac{kq_1q_2}{r^2}$

**CHAPTER 10**

- SKILL REVIEW (p. 588)** 1.  $y = 2x + 4$  2.  $y = \frac{1}{3}x - \frac{8}{3}$   
 3.  $y = -\frac{3}{4}x - 2$  4.  $(2, 3)$  5.  $(-1, 5)$  6.  $(4, 9)$

