Fill-in-the Blank Items

1. One-to-one **3.** $(0, 1)$ and $(1, a)$ **5.** 4 **7.** 1 **9.** All real numbers greater than 0 **11.** 1

True/False Items

1. False **3.** True **5.** False **7.** True **9.** False

Review Exercises

1. $f^{-1}(x) = \dfrac{2x+3}{5x-2}; f(f^{-1}(x)) = \dfrac{2\left(\dfrac{2x+3}{5x-2}\right)+3}{5\left(\dfrac{2x+3}{5x-2}\right)-2} = x;$

$$f^{-1}(f(x)) = \frac{2\left(\dfrac{2x+3}{5x-2}\right)+3}{5\left(\dfrac{2x+3}{5x-2}\right)-2} = x;$$

Domain f = Range f^{-1} = All real numbers except $\frac{2}{5}$;

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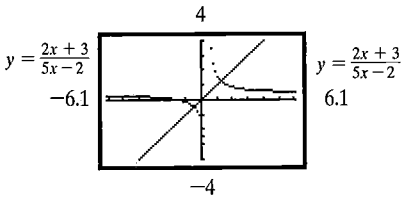
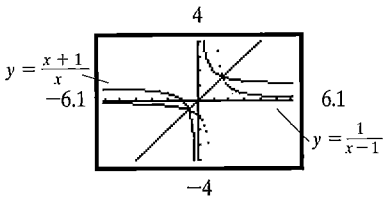


3. $f^{-1}(x) = \dfrac{x+1}{x}; f(f^{-1}(x)) = \dfrac{1}{\dfrac{x+1}{x}-1} = x;$

$$f^{-1}(f(x)) = \frac{\dfrac{1}{x-1}+1}{\dfrac{1}{x-1}} = x;$$

Domain f = Range f^{-1} = All real numbers except 1;

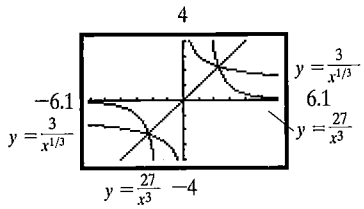
Range f = Domain f^{-1} = All real numbers except 0



5. $f^{-1}(x) = \dfrac{27}{x^3}; f(f^{-1}(x)) = \dfrac{3}{\left(\dfrac{27}{x^3}\right)^{1/3}} = x;$

$$f^{-1}(f(x)) = \frac{27}{\left(\dfrac{3}{x^{1/3}}\right)^3} = x;$$

Domain f = Range f^{-1} = All real numbers except 0;
Range f = Domain f^{-1} = All real numbers except 0



7. -3 **9.** $\sqrt{2}$ **11.** 0.4

13. $\log_3 u + 2\log_3 v - \log_3 w$

15. $2\log x + \dfrac{1}{2}\log(x^3+1)$

17. $\ln x + \dfrac{1}{3}\ln(x^2+1) - \ln(x-3)$

19. $\dfrac{25}{4}\log_4 x$ **21.** $-2\ln(x+1)$

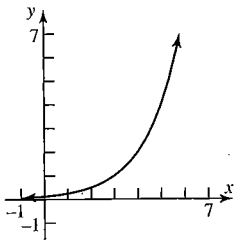
23. $\log\left(\dfrac{4x^3}{[(x+3)(x-2)]^{1/2}}\right)$

25. 2.124 **27.** $y = Ce^{2x^2}$

29. $y = \sqrt{e^{x+C}+9}$

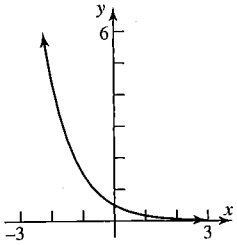
31. $y = \ln(x^2+4) - C$

33.



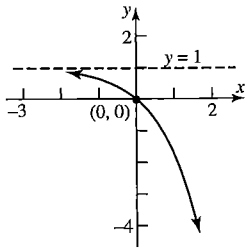
Domain: All real numbers
Range: $\{y|y > 0\}$ or $(0, \infty)$
Horizontal Asymptote: $y = 0$

35.



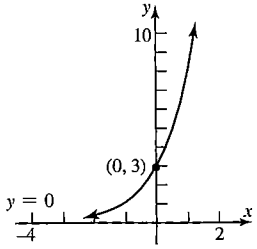
Domain: All real numbers
Range: $\{y|y > 0\}$ or $(0, \infty)$
Horizontal Asymptote: $y = 0$

37.



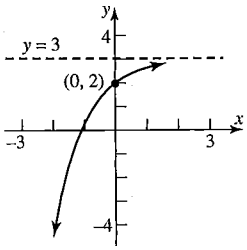
Domain: $(-\infty, \infty)$
Range: $(-\infty, 1)$
Asymptote: $y = 1$

39.



Domain: $(-\infty, \infty)$
Range: $(0, \infty)$
Asymptote: $y = 0$

41.



Domain: $(-\infty, \infty)$
Range: $(-\infty, 3)$
Asymptote: $y = 3$

43. $\frac{1}{4}$ **45.** $\left\{\frac{-1-\sqrt{3}}{2}, \frac{-1+\sqrt{3}}{2}\right\}$ **47.** $\frac{1}{4}$ **49.** $\frac{2 \ln 3}{\ln 5 - \ln 3} \approx 4.301$ **51.** $\frac{12}{5}$

53. 83 **55.** $\left\{\frac{1}{2}, -3\right\}$ **57.** -1 **59.** $1 - \ln 5 \approx -0.609$ **61.** $\frac{\ln 3}{3 \ln 2 - 2 \ln 3} \approx -9.327$

63. 3229.5 meters **65.** **(a)** 37.3 watts **(b)** 6.9 decibels

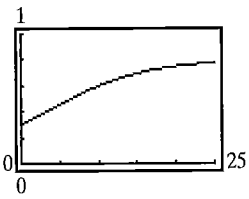
67. **(a)** 9.85 years **(b)** 4.27 years **69.** $41,669 **71.** 24,203 years ago

73. 6,078,190,457

75. **(a)** 0.3

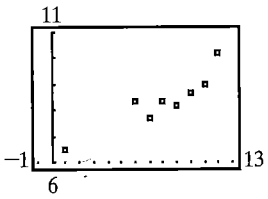
(b) 0.8

(c)



d) About 20.1 years

77. **(a)**



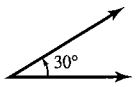
(b) Exponential model: Per capita usage $= 6.28 \times (1.03557)^{\text{year}}$

(c) 9.9 carrots

CHAPTER 6 Trigonometric Functions

6.1 Exercises

1.



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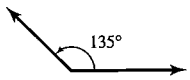

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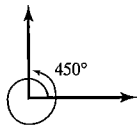

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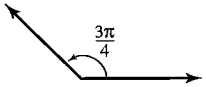

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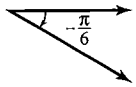
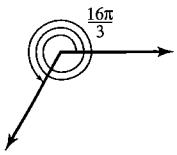


11.



13. $\frac{\pi}{6}$ **15.** $\frac{4\pi}{3}$ **17.** $-\frac{\pi}{3}$ **19.** π **21.** $-\frac{3\pi}{4}$ **23.** $-\frac{\pi}{2}$ **25.** 60° **27.** −225° **29.** 90° **31.** 15° **33.** −90° **35.** −30° **37.** 5 m

39. 6 ft **41.** 0.6 radian **43.** $\frac{\pi}{3} \approx 1.047$ in. **45.** 0.30 **47.** −0.70 **49.** 2.18 **51.** 5.93 **53.** 179.91° **55.** 587.28° **57.** 114.59°

59. 362.11° **61.** 40.17° **63.** 1.03° **65.** 9.15° **67.** 40°19′12″ **69.** 18°15′18″ **71.** 19°59′24″ **73.** $3\pi \approx 9.4248$ in.; $5\pi \approx 15.7080$ in.

75. $\omega = \frac{1}{60}$ radian/sec; $v = \frac{1}{12}$ cm/sec **77.** Approximately 452.5 rpm **79.** 359 miles **81.** 898 mph **83.** Approximately 2292 mph

85. $\frac{3}{4}$ rpm **87.** Approximately 2.86 mph **89.** Approximately 31.47 rpm **91.** Approximately 1037 mph

93. $v_1 = r_1 w_1$, $v_2 = r_2 w_2$, and $v_1 = v_2$ so $r_1 w_1 = r_2 w_2 \Rightarrow \frac{r_1}{r_2} = \frac{w_2}{w_1}$.