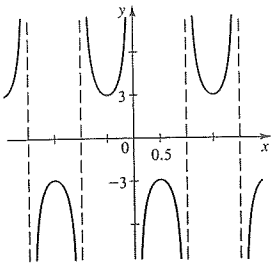
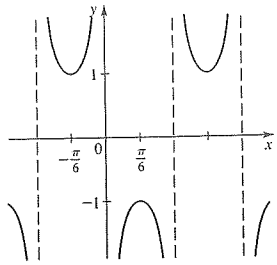
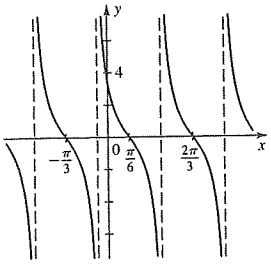
51. 2



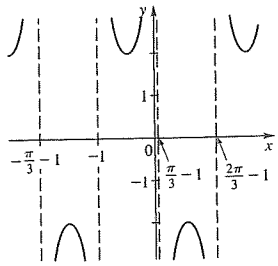
52. $2\pi/3$



53. $\pi/2$

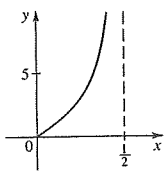


54. $2\pi/3$



57. **(a)** 1.53 mi, 3.00 mi, 18.94 mi

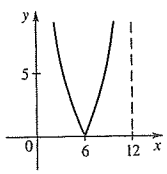
(b)



(c) $d(t)$ approaches ∞

58. **(a)** $S(2) = 10.39$ ft, $S(8) = 3.46$ ft, $S(11\frac{3}{4}) = 91.54$ ft, $S(12)$ is undefined

(b)



(c) 3, 9; 9:00 A.M., 3:00 P.M.

(d) The shadow gets increasingly longer.

SECTION 5.5 ■ PAGE 411

1. **(a)** $[-\pi/2, \pi/2]$, y, x, $\pi/6$, $\pi/6$, $\frac{1}{2}$ **(b)** $[0, \pi]$; y, x, $\pi/3$, $\pi/3$, $\frac{1}{2}$ **2.** $[-1, 1]$; (b) **3.** **(a)** $\pi/2$ **(b)** $\pi/3$ **(c)** Undefined **4.** **(a)** $-\pi/2$ **(b)** $\pi/4$ **(c)** Undefined **5.** **(a)** π **(b)** $\pi/3$ **(c)** $5\pi/6$ **6.** **(a)** $\pi/4$ **(b)** 0 **(c)** $3\pi/4$ **7.** **(a)** $-\pi/4$ **(b)** $\pi/3$ **(c)** $\pi/6$ **8.** **(a)** 0 **(b)** $-\pi/3$ **(c)** $-\pi/6$ **9.** **(a)** $2\pi/3$ **(b)** $-\pi/4$ **(c)** $\pi/4$ **10.** **(a)** $\pi/2$ **(b)** 0 **(c)** $-\pi/6$ **11.** 0.72973 **12.** -1.09491 **13.** 2.01371 **14.** 1.11024 **15.** 2.75876 **16.** 0.13889 **17.** 1.47113 **18.** -1.53235 **19.** 0.88998 **20.** Undefined **21.** -0.26005 **22.** -0.25168 **23.** $\frac{1}{4}$ 24. $\frac{2}{3}$ **25.** 5 **26.** Undefined **27.** Undefined **28.** $\frac{3}{2}$ **29.** $5\pi/6$ **30.** $\pi/4$ **31.** $-\pi/6$ **32.** $-\pi/4$ **33.** $\pi/6$ **34.** $\pi/6$ **35.** $\pi/6$ **36.** $\pi/3$ **37.** $-\pi/3$ **38.** $\pi/4$ **39.** $\sqrt{3}/3$ **40.** 1 **41.** $\frac{1}{2}$ **42.** 1 **43.** $-\sqrt{2}/2$ **44.** $-\sqrt{3}/2$

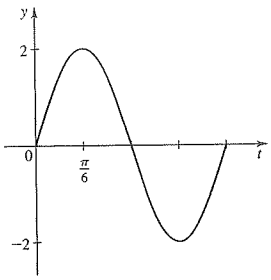
SECTION 5.6 ■ PAGE 420

1. **(a)** $a \sin \omega t$ **(b)** $a \cos \omega t$

2. **(a)** $ke^{-ct} \sin \omega t$ **(b)** $ke^{-ct} \cos \omega t$

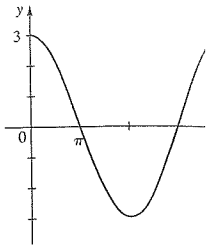
3. **(a)** $2, 2\pi/3, 3/(2\pi)$

(b)



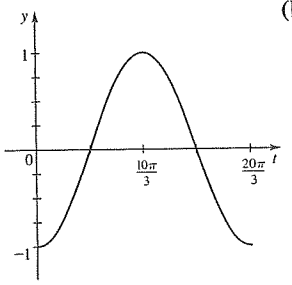
4. **(a)** $3, 4\pi, 1/(4\pi)$

(b)



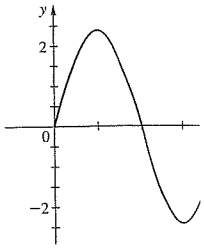
5. **(a)** $1, 20\pi/3, 3/(20\pi)$

(b)

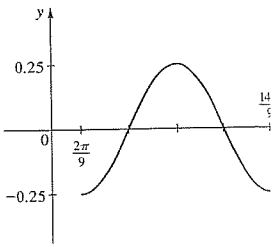


6. **(a)** $2.4, 5\pi/9, 9/(5\pi)$

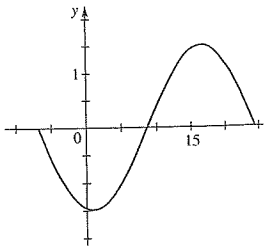
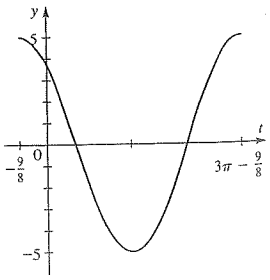
(b)



7. **(a)** $\frac{1}{4}, 4\pi/3, 3/(4\pi)$ **(b)**



8. **(a)** $\frac{3}{2}, 10\pi, 1/(10\pi)$ **(b)**



9. **(a)** $5, 3\pi, 1/(3\pi)$ **(b)**