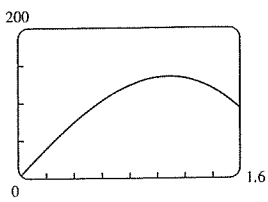
SECTION 6.3 ■ PAGE 459

1. y/r; x/r; y/x **2.** quadrant, positive, negative, negative
3. (a) 30° (b) 30° (c) 30° **4.** (a) 60° (b) 30° (c) 60°
5. (a) 45° (b) 90° (c) 75° **6.** (a) 81° (b) 19° (c) 1°
7. (a) $\pi/4$ (b) $\pi/6$ (c) $\pi/3$ **8.** (a) $\pi/3$ (b) $\pi/4$
(c) $\pi/6$ **9.** (a) $2\pi/7$ (b) 0.4π (c) 1.4 **10.** (a) 0.3π
(b) 0.84 (c) 0 **11.** $\frac{1}{2}$ **12.** $-\sqrt{2}/2$ **13.** $-\sqrt{3}/2$
14. $\frac{1}{2}$ **15.** $-\sqrt{3}$ **16.** 2 **17.** 1 **18.** $\sqrt{3}$ **19.** $-\sqrt{3}/2$
20. -2 **21.** $\sqrt{3}/3$ **22.** $\frac{1}{2}$ **23.** $\sqrt{3}/2$ **24.** $-\sqrt{3}/2$
25. -1 **26.** $\frac{1}{2}$ **27.** $\frac{1}{2}$ **28.** $-\sqrt{3}/3$ **29.** 2 **30.** $-\sqrt{2}$
31. -1 **32.** $\sqrt{2}/2$ **33.** Undefined **34.** $-\frac{1}{2}$
35. III **36.** IV **37.** IV **38.** II
39. $\tan\theta = -\sqrt{1-\cos^2\theta}/\cos\theta$
40. $\cot\theta = -\sqrt{1-\sin^2\theta}/\sin\theta$
41. $\cos\theta = \sqrt{1-\sin^2\theta}$ **42.** $\sec\theta = \dfrac{1}{\sqrt{1-\sin^2\theta}}$
43. $\sec\theta = -\sqrt{1+\tan^2\theta}$ **44.** $\csc\theta = -\sqrt{1+\cot^2\theta}$
45. $\cos\theta = -\frac{4}{5}$, $\tan\theta = -\frac{3}{4}$, $\csc\theta = \frac{5}{3}$, $\sec\theta = -\frac{5}{4}$, $\cot\theta = -\frac{4}{3}$
46. $\sin\theta = -\sqrt{95}/12$, $\tan\theta = \sqrt{95}/7$, $\csc\theta = -12\sqrt{95}/95$,
$\sec\theta = -12/7$, $\cot\theta = 7\sqrt{95}/95$
47. $\sin\theta = -\frac{3}{5}$, $\cos\theta = \frac{4}{5}$, $\csc\theta = -\frac{5}{3}$, $\sec\theta = \frac{5}{4}$, $\cot\theta = -\frac{4}{3}$
48. $\sin\theta = -2\sqrt{6}/5$, $\cos\theta = \frac{1}{5}$, $\tan\theta = -2\sqrt{6}$,
$\csc\theta = -5\sqrt{6}/12$, $\cot\theta = -\sqrt{6}/12$
49. $\sin\theta = \frac{1}{2}$, $\cos\theta = \sqrt{3}/2$, $\tan\theta = \sqrt{3}/3$,
$\sec\theta = 2\sqrt{3}/3$, $\cot\theta = \sqrt{3}$
50. $\sin\theta = -4\sqrt{17}/17$, $\cos\theta = -\sqrt{17}/17$, $\tan\theta = 4$,
$\csc\theta = -\sqrt{17}/4$, $\sec\theta = -\sqrt{17}$
51. $\sin\theta = 3\sqrt{5}/7$, $\tan\theta = -3\sqrt{5}/2$, $\csc\theta = 7\sqrt{5}/15$,
$\sec\theta = -\frac{7}{2}$, $\cot\theta = -2\sqrt{5}/15$
52. $\sin\theta = 4\sqrt{17}/17$, $\cos\theta = -\sqrt{17}/17$, $\csc\theta = \sqrt{17}/4$,
$\sec\theta = -\sqrt{17}$, $\cot\theta = -\frac{1}{4}$ **53.** (a) $\sqrt{3}/2$, $\sqrt{3}$
(b) $\frac{1}{2}$, $\sqrt{3}/4$ (c) $\frac{3}{4}$, 0.88967 **54.** 30.0 **55.** 19.1 **56.** 43.3
57. 66.1° **58.** $\sqrt{96}$ cm $\approx$ 9.8 cm **59.** $(4\pi/3) - \sqrt{3} \approx 2.46$
60. $120\pi + 36\sqrt{3} \approx 439.3$
63. (b)

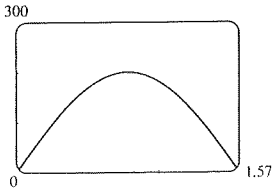
θ	20°	60°	80°	85°
h	1922	9145	29,944	60,351

64. (b)



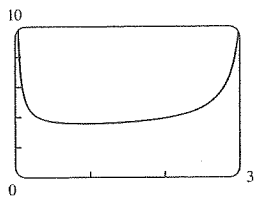
(c) 60°

65. (a) $A(\theta) = 400\sin\theta\cos\theta$
(b)



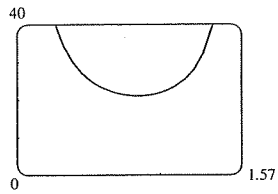
(c) width = depth $\approx$ 14.14 in.
66. $S(\theta) = 8000\,k\cos\theta\sin^2\theta$
67. (a) $9\sqrt{3}/4$ ft $\approx$ 3.897 ft, $\frac{9}{16}$ ft = 0.5625 ft
(b) 23.982 ft, 3.462 ft **68.** 15.8 s

69. (a)



(b) 0.946 rad or 54°

70. (b)



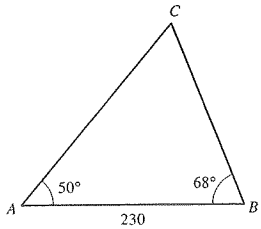
(c) 21.07 **71.** 42°

SECTION 6.4 ■ PAGE 467

1. (a) $[-1, 1]$, $[-\pi/2, \pi/2]$ (b) $[-1, 1]$, $[0, \pi]$
(c) $\mathbb{R}$, $(-\pi/2, \pi/2)$ **2.** (a) $\frac{8}{10}$ (b) $\frac{6}{10}$ (c) $\frac{8}{6}$ **3.** (a) $\pi/6$
(b) $5\pi/6$ (c) $-\pi/4$ **4.** (a) $-\pi/3$ (b) $3\pi/4$ (c) $-\pi/3$
5. (a) $-\pi/6$ (b) $\pi/3$ (c) $\pi/6$ **6.** (a) $-\pi/2$ (b) 0 (c) 0
7. 0.46677 **8.** 2.41886 **9.** 1.82348 **10.** 0.33984
11. 1.24905 **12.** -1.32582 **13.** Undefined **14.** Undefined
15. 36.9° **16.** 21.3° **17.** 34.7° **18.** 25.4° **19.** 34.9°
20. 27.3° **21.** 30°, 150° **22.** 60°, 120° **23.** 44.4°, 135.6°
24. 14.5°, 165.5° **25.** 45.6° **26.** 83.6° **27.** $\frac{4}{5}$ **28.** $\frac{4}{3}$ **29.** $\frac{13}{5}$
30. $\frac{25}{24}$ **31.** $\frac{12}{5}$ **32.** $\sqrt{5}/2$ **33.** $\sqrt{1-x^2}$ **34.** $x/\sqrt{x^2+1}$
35. $x/\sqrt{1-x^2}$ **36.** $1/\sqrt{x^2+1}$ **37.** 72.5°, 19 ft **38.** 38.7°
39. (a) $h = 2\tan\theta$ (b) $\theta = \tan^{-1}(h/2)$
40. (a) $\theta = \tan^{-1}(50/s)$ (b) $\theta = 68.2°$
41. (a) $\theta = \sin^{-1}(h/680)$ (b) $\theta = 0.826$ rad
42. (a) $\theta = \cos^{-1}\left(\dfrac{3960}{h+3960}\right)$ (b) $s = 7920\theta$
(c) $s = 7920\cos^{-1}\left(\dfrac{3960}{h+3960}\right)$ (d) 1761.5 mi (e) 197.3 mi
43. (a) 54.1° (b) 48.3°, 32.2°, 24.5°. The function $\sin^{-1}$ is undefined for values outside the interval $[-1, 1]$.

SECTION 6.5 ■ PAGE 473

1. $\dfrac{\sin A}{a} = \dfrac{\sin B}{b} = \dfrac{\sin C}{c}$ **2.** ASA, SSA **3.** 318.8 **4.** 25.4
5. 24.8 **6.** 40.3° **7.** 44° **8.** 144.9 **9.** $\angle C = 114°$, $a \approx 51$,
$b \approx 24$ **10.** $\angle B = 50°$, $a \approx 1.31$, $c \approx 2.57$
11. $\angle A = 44°$, $\angle B = 68°$, $a \approx 8.99$
12. $\angle B \approx 31.0°$, $\angle C \approx 69°$, $c \approx 6.2$
13. $\angle C = 62°$, $a \approx 200$, $b \approx 242$



14. $\angle C = 47°$, $a \approx 26.7$, $b \approx 64.2$