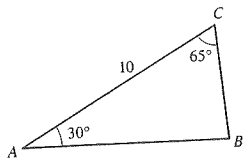
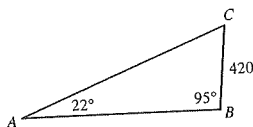


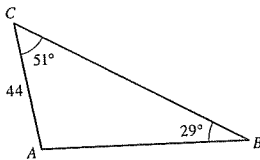
15. $\angle B = 85^\circ, a \approx 5, c \approx 9$



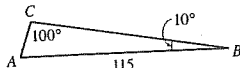
16. $\angle C = 63^\circ, b \approx 1116.9, c \approx 999.0$



17. $\angle A = 100^\circ, a \approx 89, c \approx 71$



18. $\angle A = 70^\circ, a \approx 109.7, b \approx 20.3$



19. $\angle B \approx 30^\circ, \angle C \approx 40^\circ, c \approx 19$
 20. $\angle B_1 \approx 89.6^\circ, \angle C_1 \approx 53.4^\circ, b_1 \approx 49.8;$
 $\angle B_2 \approx 16.4^\circ, \angle C_2 \approx 126.6^\circ, b_2 \approx 14.1$ 21. No solution
 22. $\angle A_1 \approx 100.7^\circ, \angle B_1 \approx 41.3^\circ, a_1 \approx 67.0;$
 $\angle A_2 \approx 3.3^\circ, \angle B_2 \approx 138.7^\circ, a_2 \approx 3.9$
 23. $\angle A_1 \approx 125^\circ, \angle C_1 \approx 30^\circ, a_1 \approx 49;$
 $\angle A_2 \approx 5^\circ, \angle C_2 \approx 150^\circ, a_2 \approx 5.6$
 24. $\angle B_1 \approx 41.8^\circ, \angle C_1 \approx 108.2^\circ, c_1 \approx 142.5;$
 $\angle B_2 \approx 138.2^\circ, \angle C_2 \approx 11.8^\circ, c_2 \approx 30.7$ 25. No solution
 26. $\angle B \approx 34.4^\circ, \angle C \approx 10.6^\circ, c \approx 25.9$
 27. $\angle A_1 \approx 57.2^\circ, \angle B_1 \approx 93.8^\circ, b_1 \approx 30.9;$
 $\angle A_2 \approx 122.8^\circ, \angle B_2 \approx 28.2^\circ, b_2 \approx 14.6$
 28. $\angle A_1 \approx 49.7^\circ, \angle C_1 \approx 72.3^\circ, a_1 \approx 65.7;$
 $\angle A_2 \approx 14.3^\circ, \angle C_2 \approx 107.7^\circ, a_2 \approx 21.3$
 29. (a) 91.146° (b) 14.427° 30. 5.25 33. (a) 1018 mi
 (b) 1017 mi 34. (a) 3.77 mi (b) 2.00 mi 35. 219 ft
 36. 678.5 ft 37. 55.9 m 38. 161.1 ft 39. 175 ft
 40. 155 m 41. 192 m 42. 48.2° 43. 0.427 AU, 1.119 AU
 44. (b) 12 cm (c) A plane

SECTION 6.6 ■ PAGE 480

1. $a^2 + b^2 - 2ab \cos C$ 2. SSS, SAS 3. 28.9 4. 26.8
 5. 47 6. 8.2 7. 29.89° 8. 111° 9. 15 10. 130.54°
 11. $\angle A \approx 39.4^\circ, \angle B \approx 20.6^\circ, c \approx 24.6$
 12. $\angle A \approx 63.0^\circ, \angle B \approx 15.5^\circ, \angle C \approx 101.5^\circ$
 13. $\angle A \approx 48^\circ, \angle B \approx 79^\circ, c \approx 3.2$
 14. $\angle B \approx 80.5^\circ, \angle C \approx 29.5^\circ, a \approx 57.2$
 15. $\angle A \approx 50^\circ, \angle B \approx 73^\circ, \angle C \approx 57^\circ$
 16. $\angle A \approx 38.6^\circ, \angle B \approx 48.5^\circ, \angle C \approx 92.9^\circ$
 17. $\angle A_1 \approx 83.6^\circ, \angle C_1 \approx 56.4^\circ, a_1 \approx 193;$
 $\angle A_2 \approx 16.4^\circ, \angle C_2 \approx 123.6^\circ, a_2 \approx 54.9$ 18. No such triangle
 19. No such triangle 20. $\angle A = 36^\circ, b \approx 109.4, c \approx 124.1$
 21. 2 22. 12.2 23. 25.4 24. 21.3° 25. 89.2°
 26. 126.5° 27. 24.3 28. 1180.8 29. 54 30. 0.97
 31. 26.83 32. 549.6 33. 5.33 34. 9.798 35. 40.77
 36. 2.46 37. 3.85 cm^2 39. 2.30 mi 40. 7.3, 3.8
 41. 23.1 mi 42. 56.0 mi 43. 2179 mi 44. 28 mi

45. (a) 62.6 mi (b) S 18.2° E 46. (a) 232.5 mi
 (b) N 50° E 47. 96° 48. 31° 49. 211 ft 50. 161 ft
 51. 3835 ft 52. 1679 ft 53. \$165,554

CHAPTER 6 REVIEW ■ PAGE 483

1. (a) $\pi/3$ (b) $11\pi/6$ (c) $-3\pi/4$ (d) $-\pi/2$
 2. (a) $2\pi/15$ (b) $-11\pi/6$ (c) $25\pi/6$ (d) $\pi/36$
 3. (a) 450° (b) -30° (c) 405° (d) $(558/\pi)^\circ \approx 177.6^\circ$
 4. (a) $(1440/\pi)^\circ \approx 458.37^\circ$ (b) $(450/\pi)^\circ \approx 143.24^\circ$
 (c) 330° (d) 108° 5. 8 m 6. 1.4 rad $\approx 80.2^\circ$
 7. 82 ft 8. 21,609 9. 0.619 rad $\approx 35.4^\circ$ 10. 25 m²
 11. 18,151 ft² 12. 0.4 rad $\approx 22.9^\circ$
 13. $300\pi \text{ rad/min} \approx 942.5 \text{ rad/min},$
 $7539.8 \text{ in./min} = 628.3 \text{ ft/min}$
 14. (a) $7000\pi \text{ rad/min} \approx 21,991 \text{ rad/min}$
 (b) $7777.8\pi \text{ rad/min} \approx 24,434.6 \text{ rad/min}$
 (c) $268,780 \text{ in./min} \approx 255 \text{ mi/h}$
 15. $\sin \theta = 5/\sqrt{74}, \cos \theta = 7/\sqrt{74}, \tan \theta = \frac{5}{7},$
 $\csc \theta = \sqrt{74}/5, \sec \theta = \sqrt{74}/7, \cot \theta = \frac{7}{5}$
 16. $\sin \theta = \frac{3}{10}, \cos \theta = \sqrt{91}/10, \tan \theta = 3\sqrt{91}/91,$
 $\csc \theta = \frac{10}{3}, \sec \theta = 10\sqrt{91}/91, \cot \theta = \sqrt{91}/3$
 17. $x \approx 3.83, y \approx 3.21$ 18. $x \approx 2.44, y \approx 1.40$
 19. $x \approx 2.92, y \approx 3.11$ 20. $x \approx 3.46, y \approx 1.73$
 21. $A = 70^\circ, a \approx 2.819, b \approx 1.026$
 22. $C = 30^\circ, a = 40, b \approx 34.64$
 23. $A \approx 16.3^\circ, C \approx 73.7^\circ, c = 24$
 24. $A \approx 22.6^\circ, C \approx 67.4^\circ, b = 13$
 25. $a = \cot \theta, b = \csc \theta$ 26. 550 m 27. 48 m
 28. $h = \sqrt{64 - 4 \cos^2 \theta} + 2 \sin \theta$
 29. 1076 mi 30. 14,400 ft 31. $-\sqrt{2}/2$ 32. $\sqrt{2}$
 33. 1 34. $-\sqrt{3}/2$ 35. $-\sqrt{3}/3$ 36. $\sqrt{2}/2$ 37. $-\sqrt{2}/2$
 38. -2 39. $2\sqrt{3}/3$ 40. $2\sqrt{3}/3$ 41. $-\sqrt{3}$ 42. -1
 43. $\sin \theta = \frac{12}{13}, \cos \theta = -\frac{5}{13}, \tan \theta = -\frac{12}{5},$
 $\csc \theta = \frac{13}{12}, \sec \theta = -\frac{13}{5}, \cot \theta = -\frac{5}{12}$ 44. $\frac{1}{2}$ 45. 60°
 46. $\sin \theta = -\sqrt{5}/5, \cos \theta = -2\sqrt{5}/5, \tan \theta = \frac{1}{2},$
 $\csc \theta = -\sqrt{5}, \sec \theta = -\sqrt{5}/2, \cot \theta = 2$
 47. $\tan \theta = -\sqrt{1 - \cos^2 \theta}/\cos \theta$
 48. $\sec \theta = -1/\sqrt{1 - \sin^2 \theta}$ 49. $\tan^2 \theta = \sin^2 \theta/(1 - \sin^2 \theta)$
 50. $\csc^2 \theta \cos^2 \theta = \frac{1}{\sin^2 \theta} - 1$
 51. $\sin \theta = \sqrt{7}/4, \cos \theta = \frac{3}{4}, \csc \theta = 4\sqrt{7}/7, \cot \theta = 3\sqrt{7}/7$
 52. $\sin \theta = -\frac{9}{41}, \cos \theta = \frac{40}{41}, \tan \theta = -\frac{9}{40}, \cot \theta = -\frac{40}{9}$
 53. $\cos \theta = -\frac{4}{5}, \tan \theta = -\frac{3}{4}, \csc \theta = \frac{5}{3}, \sec \theta = -\frac{5}{4}, \cot \theta = -$
 54. $\sin \theta = -\frac{12}{13}, \cos \theta = -\frac{5}{13}, \tan \theta = \frac{12}{5}, \csc \theta = -\frac{13}{12}, \cot \theta =$
 55. $-\sqrt{5}/5$ 56. $\sqrt{3}$ 57. 1 58. $-\sqrt{3}/2$
 59. $\pi/3$ 60. $\pi/6$ 61. $2/\sqrt{21}$ 62. $\sqrt{55}/8$ 63. $x/\sqrt{1+x}$
 64. $1/\sqrt{1-x^2}$ 65. $\theta = \cos^{-1}(x/3)$ 66. $\theta = \tan^{-1}(x/2)$
 67. 5.32 68. 1.46 69. 148.07 70. 77.82 71. 9.17 72.
 73. 54.1° or 125.9° 74. 52.0° 75. 80.4° 76. 153.2°
 77. 77.3 mi 78. 1160 ft 79. 3.9 mi 80. 80.8 mi
 81. 32.12 82. 14.98

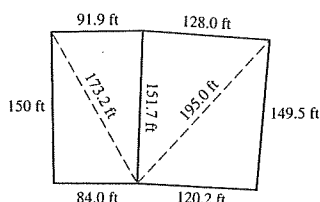
CHAPTER 6 TEST ■ PAGE 487

1. $11\pi/6, -3\pi/4$ 2. $240^\circ, -74.5^\circ$
 3. (a) $240\pi \text{ rad/min} \approx 753.98 \text{ rad/min}$
 (b) $12,063.7 \text{ ft/min} = 137 \text{ mi/h}$ 4. (a) $\sqrt{2}/2$
 (b) $\sqrt{3}/3$ (c) 2 (d) 1 5. $(26 + 6\sqrt{13})/39$
 6. $a = 24 \sin \theta, b = 24 \cos \theta$ 7. $(4 - 3\sqrt{2})/4$

8. $-\frac{13}{12}$ 9. $\tan \theta = -\sqrt{\sec^2 \theta - 1}$ 10. 19.6 ft
 11. (a) $\theta = \tan^{-1}(x/4)$ (b) $\theta = \cos^{-1}(3/x)$ 12. $\frac{40}{41}$
 13. 9.1 14. 250.5 15. 8.4 16. 19.5 17. 78.6° 18. 40.2°
 19. (a) 15.3 m^2 (b) 24.3 m 20. (a) 129.9° (b) 44.9
 21. 554 ft

FOCUS ON MODELING ■ PAGE 490

1. 1.41 mi 2. 1.31 mi
 3. 14.3 m 4. 119.2 m
 5. (c) 2349.8 ft 6. 4194 ft
 7.


CHAPTER 7
SECTION 7.1 ■ PAGE 498

1. all; 1 2. $\cos(-x) = \cos x$ 3. $\sin t$ 4. $\cot t$ 5. $\tan \theta$
 6. $\sec \theta$ 7. -1 8. $\tan x$ 9. $\csc u$ 10. 1 11. $\tan \theta$
 12. $\sec \theta$ 13. 1 14. $\cos x$ 15. $\cos y$ 16. $\sin x$ 17. $\sin^2 x$
 18. $\sin x$ 19. $\sec x$ 20. 1 21. $2 \sec u$ 22. 1 23. $\cos^2 x$
 24. $\sin A + \cos A$ 25. $\cos \theta$ 26. $1 - \sin x$
 27. (a) $\text{LHS} = \frac{1 - \sin^2 x}{\sin x} = \text{RHS}$
 28. (a) $\text{LHS} = \frac{1 - \cos^2 y}{\cos y} = \text{RHS}$
 29. $\text{LHS} = \sin \theta \frac{\cos \theta}{\sin \theta} = \text{RHS}$
 30. $\text{LHS} = \frac{\sin x}{\cos x} \cdot \cos x = \text{RHS}$
 31. $\text{LHS} = \cos u \frac{1}{\cos u} \cot u = \text{RHS}$
 32. $\text{LHS} = \frac{\cos x}{\sin x} \cdot \frac{1}{\cos x} \cdot \sin x = \text{RHS}$
 33. $\text{LHS} = \sin B + \cos B \frac{\cos B}{\sin B}$
 $= \frac{\sin^2 B + \cos^2 B}{\sin B} = \frac{1}{\sin B} = \text{RHS}$
 34. $\text{LHS} = \cos x - (-\sin x) = \text{RHS}$
 35. $\text{LHS} = -\frac{\cos \alpha}{\sin \alpha} \cos \alpha - \sin \alpha = \frac{-\cos^2 \alpha - \sin^2 \alpha}{\sin \alpha}$
 $= \frac{-1}{\sin \alpha} = \text{RHS}$
 36. $\text{LHS} = \csc^2 x - \sin x \csc x = \csc^2 x - 1 = \text{RHS}$
 37. $\text{LHS} = \frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta} = \frac{\sin^2 \theta + \cos^2 \theta}{\cos \theta \sin \theta}$
 $= \frac{1}{\cos \theta \sin \theta} = \text{RHS}$
 38. $\text{LHS} = \sin^2 x + 2 \sin x \cos x + \cos^2 x = \text{RHS}$
 39. $\text{LHS} = 1 - \cos^2 \beta = \sin^2 \beta = \text{RHS}$
 40. $\text{LHS} = \cos^2 x + \sin^2 x = \text{RHS}$
 41. $\text{LHS} = \frac{(\sin x + \cos x)^2}{(\sin x + \cos x)(\sin x - \cos x)} = \frac{\sin x + \cos x}{\sin x - \cos x}$
 $= \frac{(\sin x + \cos x)(\sin x - \cos x)}{(\sin x - \cos x)(\sin x - \cos x)} = \text{RHS}$
 42. $\text{LHS} = [(\sin x + \cos x)^2]^2$
 $= (\sin^2 x + 2 \sin x \cos x + \cos^2 x)^2 = \text{RHS}$
 43. $\text{LHS} = \frac{\frac{1}{\cos t} - \cos t}{\frac{1}{\cos t}} \cdot \frac{\cos t}{\cos t} = \frac{1 - \cos^2 t}{1} = \text{RHS}$
 44. $\text{LHS} = \frac{1 - \sin x}{1 + \sin x} \cdot \frac{1 - \sin x}{1 - \sin x} = \frac{1 - 2 \sin x + \sin^2 x}{1 - \sin^2 x}$
 $= \frac{1}{\cos^2 x} - \frac{2 \sin x}{\cos^2 x} + \frac{\sin^2 x}{\cos^2 x}$
 $= \sec^2 x - 2 \sec x \tan x + \tan^2 x$
 $= (\sec x - \tan x)^2 = \text{RHS}$
 45. $\text{LHS} = \frac{1}{\cos^2 y} = \sec^2 y = \text{RHS}$
 46. $\text{LHS} = \frac{1}{\sin x} - \sin x = \frac{1 - \sin^2 x}{\sin x} = \frac{\cos^2 x}{\sin x} = \text{RHS}$
 47. $\text{LHS} = \cot x \cos x + \cot x - \csc x \cos x - \csc x$
 $= \frac{\cos^2 x}{\sin x} + \frac{\cos x}{\sin x} - \frac{\cos x}{\sin x} - \frac{1}{\sin x} = \frac{\cos^2 x - 1}{\sin x}$
 $= \frac{-\sin^2 x}{\sin x} = \text{RHS}$
 48. $\text{LHS} = (\sin^2 \theta)^2 - (\cos^2 \theta)^2$
 $= (\sin^2 \theta - \cos^2 \theta)(\sin^2 \theta + \cos^2 \theta) = \text{RHS}$
 49. $\text{LHS} = \sin^2 x \left(1 + \frac{\cos^2 x}{\sin^2 x} \right) = \sin^2 x + \cos^2 x = \text{RHS}$
 50. $\text{LHS} = \cos^2 x - (1 - \cos^2 x) = 2 \cos^2 x - 1 = \text{RHS}$
 51. $\text{LHS} = 2(1 - \sin^2 x) - 1 = 2 - 2 \sin^2 x - 1 = \text{RHS}$
 52. $\text{LHS} = \left(\frac{\sin y}{\cos y} + \frac{\cos y}{\sin y} \right) \sin y \cos y$
 $= \sin^2 y + \cos^2 y = \text{RHS}$
 53. $\text{LHS} = \frac{1 - \cos \alpha}{\sin \alpha} \cdot \frac{1 + \cos \alpha}{1 + \cos \alpha}$
 $= \frac{1 - \cos^2 \alpha}{\sin \alpha(1 + \cos \alpha)} = \frac{\sin^2 \alpha}{\sin \alpha(1 + \cos \alpha)} = \text{RHS}$
 54. $\text{LHS} = 1 + \tan^2 \alpha = \sec^2 \alpha = \text{RHS}$
 55. $\text{LHS} = \frac{\sin^2 \theta}{\cos^2 \theta} - \frac{\sin^2 \theta \cos^2 \theta}{\cos^2 \theta}$
 $= \frac{\sin^2 \theta(1 - \cos^2 \theta)}{\cos^2 \theta} = \frac{\sin^2 \theta \sin^2 \theta}{\cos^2 \theta} = \text{RHS}$
 56. $\text{LHS} = \frac{\cos^2 \theta}{\sin^2 \theta} \cos^2 \theta = \frac{\cos^2 \theta(1 - \sin^2 \theta)}{\sin^2 \theta}$
 $= \frac{\cos^2 \theta}{\sin^2 \theta} - \frac{\cos^2 \theta \sin^2 \theta}{\sin^2 \theta} = \text{RHS}$
 57. $\text{LHS} = \frac{\sin x - 1}{\sin x + 1} \cdot \frac{\sin x + 1}{\sin x + 1} = \frac{\sin^2 x - 1}{(\sin x + 1)^2} = \text{RHS}$
 58. $\text{LHS} = \frac{\sin w}{\sin w + \cos w} \cdot \frac{\frac{1}{\cos w}}{\frac{1}{\cos w}} = \frac{\frac{\sin w}{\cos w}}{\frac{\sin w}{\cos w} + \frac{\cos w}{\cos w}} = \text{RHS}$
 59. $\text{LHS} = \frac{\sin^2 t + 2 \sin t \cos t + \cos^2 t}{\sin t \cos t}$
 $= \frac{\sin^2 t + \cos^2 t}{\sin t \cos t} + \frac{2 \sin t \cos t}{\sin t \cos t} = \frac{1}{\sin t \cos t} + 2$
 $= \text{RHS}$