64. A billiard ball travels 2.7 m at an angle of 13° with respect to the long side of the table. What are the components of the ball's displacement?

65. A golf ball has a velocity of 1.20 m/s at 14.0° east of north. What are the velocity components?

66. A tiger leaps with an initial velocity of 55.0 km/h at an angle of 13.0° with respect to the horizontal. What are the components of the tiger's velocity?

67. A tramway extends 3.88 km up a mountain from a station 0.8 km above sea level. If the horizontal displacement is 3.45 km, how far above sea level is the mountain peak?

68. A bullet travels 850 m, ricochets, and moves another 640 m at an angle of 36° from its previous forward motion. What is the bullet's resultant displacement?

69. A bird flies 46 km at 15° south of east, then 22 km at 13° east of south, and finally 14 km at 14° west of south. What is the bird's displacement?

70. A ball is kicked with a horizontal speed of 9.37 m/s off the top of a mountain. The ball moves 85.0 m horizontally before hitting the ground. How tall is the mountain?

71. A ball is kicked with a horizontal speed of 1.50 m/s from a height of 2.50×10^2 m. What is its horizontal displacement when it hits the ground?

72. What is the velocity of the ball in problem 71 when it reaches the ground?

73. A shingle slides off a roof at a speed of 2.0 m/s and an angle of 30.0° below the horizontal. How long does it take the shingle to fall 45 m?

74. A ball is thrown with an initial speed of 10.0 m/s and an angle of 37.0° above the horizontal. What are the vertical and horizontal components of the ball's displacement after 2.5 s?

75. A rocket moves north at 55.0 km/h with respect to the air. It encounters a wind from 17.0° north of west at 40.0 km/h with respect to Earth. What is the rocket's velocity with respect to Earth?

76. How far to the north and west does the rocket in problem 75 travel after 15.0 min?

77. A cable car travels 2.00×10^2 m on level ground, then 3.00×10^2 m at an incline of 3.0°, and then 2.00×10^2 m at an incline of 8.8°. What is the final displacement of the cable car?

78. A hurricane moves 790 km at 18° north of west, then due west for 150 km, then north for 470 km, and finally 15° east of north for 240 km. What is the hurricane's resultant displacement?

79. What is the range of an arrow shot horizontally at 85.3 m/s from 1.50 m above the ground?

80. A drop of water in a fountain takes 0.50 s to travel 1.5 m horizontally. The water is projected upward at an angle of 33°. What is the drop's initial speed?

81. A golf ball is hit up a 41.0° ramp to travel 4.46 m horizontally and 0.35 m below the edge of the ramp. What is the ball's initial speed?

82. A flare is fired with a velocity of 87 km/h west from a car traveling 145 km/h north. With respect to Earth, what is the flare's resultant displacement 0.45 s after being launched?

83. A sailboat travels south at 12.0 km/h with respect to the water against a current 15.0° south of east at 4.0 km/h. What is the boat's velocity?

Chapter 4 Forces and the Laws of Motion

84. A boat exerts a 9.5×10^4 N force 15.0° north of west on a barge. Another exerts a 7.5×10^4 N force north. What direction is the barge moved?

85. A shopper exerts a force on a cart of 76 N at an angle of 40.0° below the horizontal. How much force pushes the cart in the forward direction?

86. How much force pushes the cart in problem 85 against the floor?

87. What are the magnitudes of the largest and smallest net forces that can be produced by combining a force of 6.0 N and a force of 8.0 N?

88. A buoyant force of 790 N lifts a 214 kg sinking boat. What is the boat's net acceleration?

89. A house is lifted by a net force of 2850 N and moves from rest to an upward speed of 15 cm/s in 5.0 s. What is the mass of the house?

90. An 8.0 kg bag is lifted 20.0 cm in 0.50 s. If it is initially at rest, what is the net force on the bag?

91. A 90.0 kg skier glides at constant speed down a 17.0° slope. Find the frictional force on the skier.

92. A snowboarder slides down a 5.0° slope at a constant speed. What is the coefficient of kinetic friction between the snow and the board?

93. A 2.00 kg block is in equilibrium on a 36.0° incline. What is the normal force on the block?

94. A 1.8×10^3 kg car is parked on a hill on a 15.0° incline. A 1.25×10^4 N frictional force holds the car in place. Find the coefficient of static friction.