Mr. Klansek Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_ Block: \_\_\_\_\_\_

Vectors (3.2)

Solve

1. The pronghorn antelope, found in North America, is the best long-distance runner among mammals. It has been observed to travel at an average speed of more than 55 km/h over a distance of 6.0 km. Suppose the antelope runs a distance of 5.0 km in a direction 11.5° north of east, turns, and then runs 1.0 km south. Calculate the resultant displacement.
2. A South-African sharp-nosed frog set a record for a triple jump by traveling a distance of 10.3 m. Suppose the frog starts from the origin of a coordinate system and lands at a point whose coordinate on the y-axis is equal to −6.10 m. What angle does the vector of displacement make with the negative y-axis? Calculate the x component of the frog.
3. The landing speed of the space shuttle Columbia is 347 km/h. If the shuttle is landing at an angle of 15.0° with respect to the horizontal, what are the horizontal and the vertical components of its velocity?
4. The emperor penguin is the best diver among birds: the record dive is 483 m. Suppose an emperor penguin dives vertically to a depth of 483 m and then swims horizontally a distance of 225 m. What angle would the vector of the resultant displacement make with the water’s surface? What is the magnitude of the penguin’s resultant displacement?
5. For six weeks in 1992, Akira Matsushima, from Japan, rode a unicycle more than 3000 mi across the United States. Suppose Matsushima is riding through a city. If he travels 250.0 m east on one street, then turns counterclockwise through a 120.0° angle and proceeds 125.0 m northwest along a diagonal street, what is his resultant displacement?
6. In Virginia during 1994 Elmer Trett reached a speed of 372 km/h on his motorcycle. Suppose Trett rode northwest at this speed for 8.7 s. If the angle between east and the direction of Trett’s ride was 60.0°, what was Trett’s displacement east? What was his displacement north?