

## Vector Practice

1. Rose drives a car 2.0 kilometers north. She turns the car and travels 3.0 kilometers west. Determine the displacement of the car in magnitude-direction form.
2. Kala climbs a 5.0 meter ladder. The ladder rests against a wall at an angle of 60 degrees above the horizontal. Determine the horizontal and vertical components of Kala's displacement from the base of the ladder.
3. Elijah throws a ball  $30.0 \text{ m s}^{-1}$  at an angle of 10.0 degrees above the horizontal. Determine the horizontal and vertical components of the velocity.
4. Andre walks 35.0 meters east in 15.0 seconds. He then turns north and travels 40.0 meters in 17.0 seconds. Finally, he walks 45.0 meters west in 25.0 seconds.
  - a. Draw a map of his path.
  - b. Calculate the average velocity of each segment.
  - c. Calculate his distance traveled.
  - d. Determine his displacement.
  - e. Calculate his average speed of travel for the entire motion.
  - f. Calculate his average velocity for the entire motion.
5. Akshay runs  $5.0 \text{ m s}^{-1}$  east for 10.0 minutes. He then turns north and runs  $4.5 \text{ m s}^{-1}$  for 15.0 minutes.
  - a. What is his distance traveled in meters?
  - b. What is his average velocity vector?
  - c. What displacement would he need to return to the starting position?
6. Youssef travels on a boat at  $5.0 \text{ m s}^{-1}$ , 45 degrees north of east. After 20.0 seconds, the boat turns and travels  $10.0 \text{ m s}^{-1}$ , 30 degrees north of west for 10.0 seconds.
  - a. Find the initial velocity in component form.
  - b. Find the final velocity in component form.
  - c. Find the average acceleration in component form.
  - d. Find the average acceleration in magnitude-direction form.