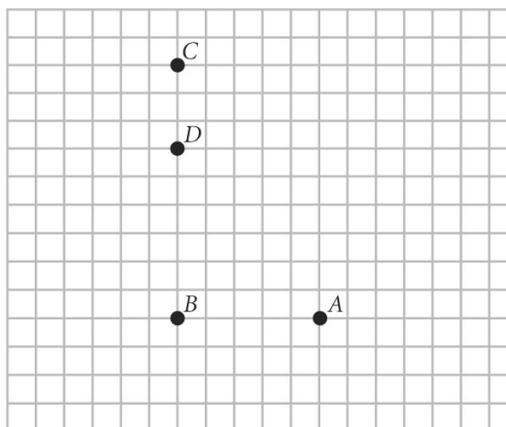


Two-Dimensional Motion and Vectors

Chapter Study Guide

1. The diagram below indicates three positions to which a woman travels. She starts at position *A*, travels 3.0 km to the west to point *B*, then 6.0 km to the north to point *C*. She then backtracks, and travels 2.0 km to the south to point *D*.



- a. In the space provided, diagram the displacement vectors for each segment of the woman's trip.
- b. What is the total displacement of the woman from her initial position, *A*, to her final position, *D*?

c. What is the total distance traveled by the woman from her initial position, *A*, to her final position, *D*?

2. Two projectiles are launched from the ground, and both reach the same vertical height. However, projectile B travels twice the horizontal distance as projectile A before hitting the ground.

- a. How large is the vertical component of the initial velocity of projectile B compared with the vertical component of the initial velocity of projectile A?

- b. How large is the horizontal component of the initial velocity of projectile B compared with the horizontal component of the initial velocity of projectile A?

- c. Suppose projectile A is launched at an angle of 45° to the horizontal. What is the ratio, v_B/v_A , of the speed of projectile B, v_B , compared with the speed of projectile A, v_A ?

Chapter Study Guide *continued*

3. A passenger at an airport steps onto a moving sidewalk that is 100.0 m long and is moving at a speed of 1.5 m/s. The passenger then starts walking at a speed of 1.0 m/s in the same direction as the sidewalk is moving. What is the passenger's velocity relative to the following observers?

a. A person standing stationary alongside to the moving sidewalk.

b. A person standing stationary *on* the moving sidewalk.

c. A person walking alongside the sidewalk with a speed of 2.0 m/s and in a direction opposite the motion of the sidewalk.

d. A person riding in a cart alongside the sidewalk with a speed of 5.0 m/s and in the same direction in which the sidewalk is moving.

e. A person riding in a cart with a speed of 4.0 m/s and in a direction perpendicular to the direction in which the sidewalk is moving.

4. Use the information given in item 3 to answer the following questions:

a. How long does it take for the passenger walking on the sidewalk to get from one end of the sidewalk to the other end?

b. How much time does the passenger save by taking the moving sidewalk instead of walking alongside it?
