PRACTICE F

Relative Velocity

1. A passenger at the rear of a train traveling at 15 m/s relative to Earth throws a baseball with a speed of 15 m/s in the direction opposite the motion of the train. What is the velocity of the baseball relative to Earth as it leaves the thrower's hand?
2. A spy runs from the front to the back of an aircraft carrier at a velocity of 3.5 m/s. If the aircraft carrier is moving forward at 18.0 m/s, how fast does the spy appear to be running when viewed by an observer on a nearby stationary submarine?
3. A ferry is crossing a river. If the ferry is headed due north with a speed of 2.5 m/s relative to the water and the river's velocity is 3.0 m/s to the east, what will the boat's velocity relative to Earth be? (Hint: Remember to include the direction in describing the velocity.)
4. A pet-store supply truck moves at 25.0 m/s north along a highway. Inside, a dog moves at 1.75 m/s at an angle of 35.0° east of north. What is the velocity of the dog relative to the road?

SECTION REVIEW

1. A woman on a 10-speed bicycle travels at 9 m/s relative to the ground as she passes a little boy on a tricycle going in the opposite direction. If the boy is traveling at 1 m/s relative to the ground, how fast does the boy appear to be moving relative to the woman?
2. A girl at an airport rolls a ball north on a moving walkway that moves east. If the ball's speed with respect to the walkway is 0.15 m/s and the walkway moves at a speed of 1.50 m/s, what is the velocity of the ball relative to the ground?
3. **Critical Thinking** Describe the motion of the following objects if they are observed from the stated frames of reference:
   - **a.** a person standing on a platform viewed from a train traveling north
   - **b.** a train traveling north viewed by a person standing on a platform
   - **c.** a ball dropped by a boy walking at a speed of 1 m/s viewed by the boy
   - **d.** a ball dropped by a boy walking 1 m/s as seen by a nearby viewer who is stationary