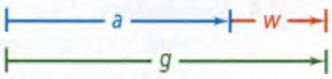
Got It? **2.** The zoo has two other water tanks that are leaking. One tank contains 10 gal of water and is leaking at a constant rate of 2 gal/h. The second tank contains 6 gal of water and is leaking at a constant rate of 4 gal/h. When will the tanks have the same amount of water? Explain.

When a plane travels from west to east across the United States, the steady west-to-east winds act as tailwinds. This increases the plane's speed relative to the ground. When a plane travels from east to west, the winds act as headwinds. This decreases the plane's speed relative to the ground.

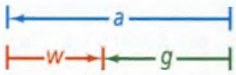
From West to East

air speed + wind speed = ground speed



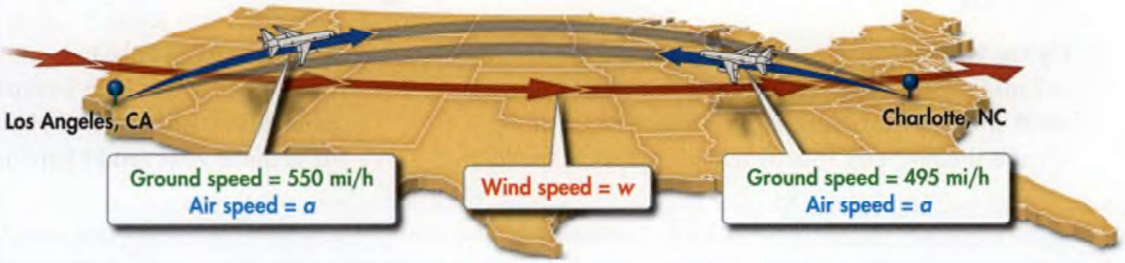
From East to West

air speed − wind speed = ground speed



Problem 3 Solving a Wind or Current Problem

Travel **A traveler flies from Charlotte, North Carolina, to Los Angeles, California. At the same time, another traveler flies from Los Angeles to Charlotte. The air speed of each plane is the same. The ground speeds are shown below. What is the air speed? What is the wind speed?**



Use the ground speed with the tailwind and with the headwind to write the system. Let a = the air speed of the planes. Let w = the wind speed.

Think

How are the speeds related?
The air speed is a plane's speed with no wind. Add wind speed and air speed to get the ground speed with a tailwind. Subtract wind speed from air speed to find the ground speed with a headwind.

$$\begin{array}{ccccccc} \text{air speed} & + & \text{wind speed} & = & \text{ground speed with tailwind} \\ a & + & w & = & 550 \end{array} \qquad \begin{array}{ccccccc} \text{air speed} & - & \text{wind speed} & = & \text{ground speed with headwind} \\ a & - & w & = & 495 \end{array}$$

Choose a method to solve the system. Use elimination.

$$\begin{array}{rl} a + w = 550 & \\ \underline{a - w = 495} & \\ 2a + 0 = 1045 & \text{Add the equations.} \\ a = 522.5 & \text{Solve for } a. \end{array}$$

Substitute 522.5 for a in either equation and solve for w.

$$\begin{array}{rl} 522.5 + w = 550 & \text{Substitute 522.5 for } a \text{ in the first equation.} \\ w = 27.5 & \text{Solve for } w. \end{array}$$

The air speed is 522.5 mi/h. The wind speed is 27.5 mi/h.