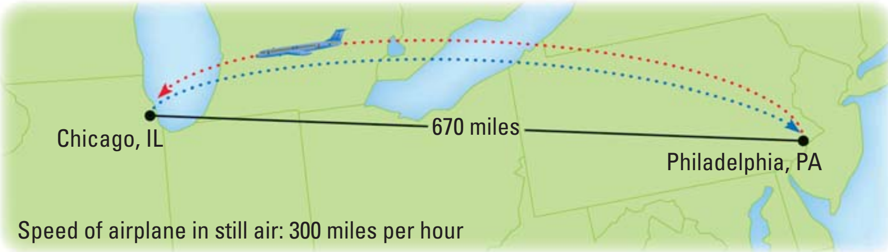
44. **TAKS REASONING** An airplane makes a round trip between two destinations as shown in the diagram. The airplane flies against the wind when traveling west and flies with the wind when traveling east. Assume that the speed of the wind remains constant during each flight.



a. **Model** Write an equation that gives the total flying time t (in hours) as a function of the speed w (in miles per hour) of the wind. Then find the total flying time if the speed of the wind is 15 miles per hour.

b. **Decide** For what value of w does the flying time one way take half as long as the total flying time? *Explain* your reasoning.

45. **ELEVATORS** According to the law in one state, the minimum weight W (in pounds) that a passenger elevator must hold is given by

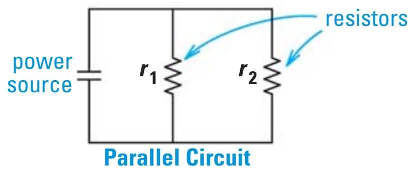
$$W = \frac{2A^2}{3} + \frac{200A}{3} \text{ if } A \le 50 \qquad \text{and} \qquad W = \frac{7A^2}{150} + (125A - 1367) \text{ if } A > 50$$

where A represents the area (in square feet) of the elevator platform.

a. Write the right side of each equation as a single rational expression.

b. What is the minimum weight that an elevator must hold if the area of the platform is 30 square feet? 60 square feet?

46. **MULTI-STEP PROBLEM** A parallel electric circuit consists of a power source and several parallel resistors through which electricity can flow. For a parallel circuit with two resistors, let r_1 represent the resistance (in ohms) of one resistor, and let r_2 represent the resistance (in ohms) of the other resistor.



a. **Model** The total resistance r_T is equal to the multiplicative inverse of $\frac{1}{r_1} + \frac{1}{r_2}$. Write $\frac{1}{r_1} + \frac{1}{r_2}$ as a single rational expression. Then write an equation that gives r_T in terms of r_1 and r_2.

b. **Calculate** Find the total resistance when one resistor has a resistance of 2 ohms and the other resistor has a resistance of 6 ohms.

47. **RADIO STATIONS** Radio stations use either amplitude modulation (AM) broadcasting or frequency modulation (FM) broadcasting. The percent a (in decimal form) of commercial radio stations that used AM broadcasting during the period 1990–2003 can be modeled by

$$a = \frac{2.8 + 0.085x}{5.3 + 0.30x}$$

where x is the number of years since 1990. Write a model that gives the percent f (in decimal form) of commercial radio stations that used FM broadcasting as a function of x. Then approximate the value of f in 2003.

= WORKED-OUT SOLUTIONS on p. WS1

= TAKS PRACTICE AND REASONING