Section 5.4 Systems of Linear Equations and Problem Solving

# Objective 1: Using Systems of Two Equations for Problem Solving

Applied problems sometimes involve two or more unknown quantities. Sometimes we are able to use a single equation involving one variable to solve problems. However, it is often easier to use two variables and create a system of two equations.

**Five Step Strategy for Solving Applied Problems Using Systems of Equations**

**Step 1:** Read the problem. If possible, create a diagram.

**Step 2:** Choose variables that describe each unknown quantity that is to be found.

**Step 3**: Write a system of equations using the given information and the variables.

**Step 4**: Solve the system of equations using the method of elimination or

 substitution.

**Step 5**: Use the solution to answer the problem. Check to make sure the answers make

 sense.

a. Find the measures of two complementary angles if the measure of one angle is $18°$ more than three times the measure of the other angle.

b. A jar contains $86$ coins each of which is either a quarter or a nickel. The total value of the coins in the jar is $\$13.90$. How many quarters and how many nickels are in the jar?

c. The flight path between two cities is a distance of $1575$ miles. On a particular round trip, a plane flew into the wind from one city to the other, and the trip took $4.5$ hours. The return trip with the wind behind them took $3.5$ hours. Find the speed of the wind and the speed of the plane in still air.

d. A chemist needs to prepare $36$ ounces of an $11\%$ hydrochloric acid solution. Find the amount of $18\%$ solution and the amount of $9\%$ solution the chemist should mix to get this $11\%$ solution.