

Application Lesson Opener

For use with pages 411–417

Randy has some \$1 bills and \$5 bills in his wallet. He has 15 bills in all. He counts the money and finds he has \$47. How many of each type of bill does Randy have?

Let x represent the number of \$1 bills and y represent the number of \$5 bills. The system of equations below is an algebraic model for this problem.

$$x + y = 15$$

$$x + 5y = 47$$

1. Add the equations by adding the like terms. Describe the result. Can you solve the resulting equation? Why or why not?
2. Subtract the equations by subtracting the like terms. Describe the result. Can you solve the resulting equation? Why or why not?

Beka is supposed to work the same number of hours each week. One week, she worked more hours than usual. The next week, she took the same number of hours off. If she worked 42 hours the first week and 34 hours the second week, how many hours is Beka supposed to work?

Let x represent the number of hours Beka is supposed to work and y represent the change from her usual number of hours. The system of equations is an algebraic model for this problem.

$$x + y = 42$$

$$x - y = 34$$

3. Add the equations by adding the like terms. Describe the result. Can you solve the resulting equation? Why or why not?
4. Subtract the equations by subtracting the like terms. Describe the result. Can you solve the resulting equation? Why or why not?

Solving Linear Systems by Linear Combinations

A linear combination of two equations is an equation obtained by *adding* one of the equations (or a multiple of one of the equations) to the other equation.

STEPS:

- 1) Arrange the equations with like terms in columns.
- * 2) Multiply one or both of the equations by a number to obtain coefficients that are opposite for one of the variables.
- 3) Add the equations from Step 2. Combining the like terms will eliminate one variable. Solve for the remaining variable.
- 4) Substitute the value obtained in Step 3 into either of the original equations and solve for the other variable.
- 5) Check the solution in each of the original equations.