



# Building Concepts: Solving Systems of Equations

## Algebraically

Student Activity

Name \_\_\_\_\_

Class \_\_\_\_\_

In these activities, you will investigate pathways for solving systems of linear equations algebraically.



### Activity 1 [Page 1.3]

1. Hil was solving  $-2x + y = -1$  and  $2x + 3y = 13$  by adding the two equations to find the value for  $y$ . She wondered which of the following steps she might take to find the value for  $x$ .
  - a. substitute the value she found for  $y$  into  $-2x + y = -1$ .
  - b. substitute the value she found for  $y$  into  $2x + 3y = 13$ .
  - c. multiply the first equation by  $-3$  and add the result to  $2x + 3y = 13$ .
  - d. multiply the first equation by  $-3$  and the second equation by  $-1$  and add the two equations.
  - e. substitute the value she found for  $y$  into both of the original equations.



### Activity 2 [Page 1.3]

1. A solution to a system of equations in two variables is an ordered pair of values that specify what each variable has to be to make both equations true. Sometimes the system actually represents the same constraints on the variables, with the same slope for the two equations and the same points make both equations true and so the solution is represented by all of the points on line. Sometimes the two equations have the same slope but the same points do not make both of them true; they represent parallel lines and the system does not have a solution.
  - a. If you find a value for  $x$  that satisfies an equation, have you solved the system? Why or why not?



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- b. If you found the value for  $x$  in a system of equations, a logical strategy is to substitute that value into one of the original equations to find the value for  $y$ . Is this always a good path to take? Give an example to support your reasoning.
- c. In solving one system of equations, Sol got a statement that said  $2 = 2$  and in another he got the statement  $2 = 0$ . What is the difference in these two statements and what do they indicate about the solutions for the system?



### Activity 3 [Page 1.3]

1. Reset. Use **menu> Equations**. Solve each of the systems in Sets 2, 3, 5, and 6 in two ways: by the addition method to eliminate a variable and by substitution. Then answer the questions below.
  - a. Which of the two methods did you prefer for this system? Why?
  - b. Would you use this method on every system of equations? Why or why not?
  - c. How do you know if your solutions are correct?