What is a Solution to a System?
Student Activity
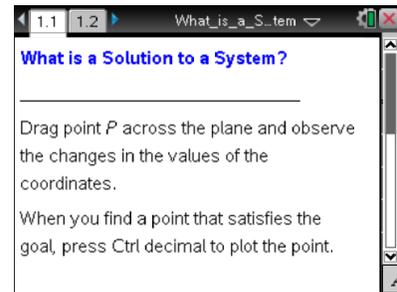
Name _____

Class _____

Open the TI-Nspire document
What_is_a_Solution_to_a_System.tns.

An ordered pair (*x*, *y*) can be thought of in two ways. The two numbers represented by *x* and *y* could be substituted into an equation involving *x* and *y*. Those same two numbers can be thought of as the coordinates (*x*, *y*) of a point in the plane. This activity relates those two ideas to each other to give you a visual way of thinking of the solution to a system of two equations.

Move to page 1.2.

Press ⌷ctrl⌷ ▶ and ⌷ctrl⌷ ◀ to navigate through the lesson.

1. Move point *P*. Describe how the coordinates relate to the *Current* equation shown in the lower-right corner of the screen.

2. a. In the *Goal* equation, *x* + *y* = *10*, if *x* = –3, what value of *y* is needed to make the equation true?

   b. Move point *P* so that the *x*-coordinate is –3 and the *Current* equation matches the *Goal* equation. Press ⌷ctrl⌷ ⌷.⌷ to mark this point.

3. Move point *P* to a new location where the *Current* equation again matches the *Goal* equation. Press ⌷ctrl⌷ ⌷.⌷ to mark this point. Mark at least four more points that make the equations match.

   What do you observe about the pattern of the points you have marked?

4. A solution to an equation in two variables is an ordered pair (*x, y*) that makes the statement true. Each point you have marked is one solution to the *Goal* equation *x* + *y* = 10. How many solutions does this equation have? How do you know?

Click the slider (∆) to change the problem.

5. Move point *P* to a location where the *Current* equation matches the *Goal* equation. Mark at least two more solutions to the equation.

    a. Describe a pattern you could use to determine two more solutions without randomly moving point *P*.

    b. Use your pattern to explain how many solutions you can find for this equation.

Click the slider (∆) to change the problem.

6. Move point *P*. Identify a point that satisfies each condition.

    a. *Rule 1* is true and *Rule 2* is false.

    b. Both rules are false.

    c. *Rule 1* is false and *Rule 2* is true.

    d. Both rules are true.

7. A solution to a system of equations is any ordered pair (*x, y*) that makes both equations true simultaneously.

    a. How many solutions are there for the system $\begin{cases} x+y = 10 \\ 2x-3y = -10 \end{cases}$? Explain your reasoning.

    b.   What is the solution to the system?

8.   How can you verify your solution in question 7b?

9.   Candice says that (3, 5) is the only solution to the system $\begin{cases} x + y = 8 \\ x - 2y = -7 \end{cases}$.

    Do you agree? Why or why not?