Intersections
ID: 9083

Activity Overview
In this activity, students graph two linear functions and estimate the solution of the system graphically using the Graph Trace feature. Then they examine functions tables to find the exact solution of the system.

Topic: Linear Systems
- *Graph a pair of linear equations and estimate their solution using the Intersection Point(s) command.*

Teacher Preparation

- *This activity is appropriate for students in Algebra 1. It is assumed that students are familiar with linear functions and their graphs.*

- *This activity is designed to have students explore **individually and in pairs**. However, an alternate approach would be to use the activity in a whole-class format. By using the computer software and the questions found in the TI-Nspire document, you can lead an interactive class discussion on the solutions of systems.*

- ***To download the student TI-Nspire document (.tns file), go to education.ti.com/exchange and enter "9083" in the keyword search box.***
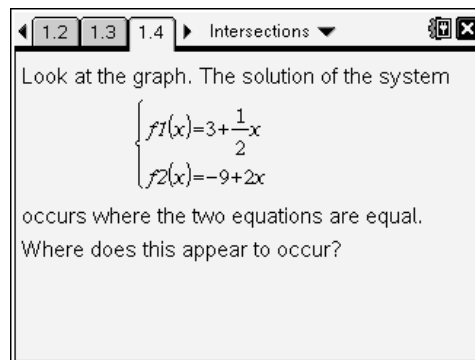
Associated Materials
- *Intersections.tns*

Problem 1

Students are prompted to graph $f1(x) = 3 + \dfrac{1}{2}x$ and

$f2(x) = -9 + 2x$ and estimate the coordinates of their intersection. They then Trace the graph of **f1** and see that the intersection point is approximately (8, 7). Next they trace **f2** and see that the point (8, 7) also lies on its graph. Then they trace both functions at once as see that as the identical *x*-values of the two points approach 8, their *y*-values get closer to each other.

Next students add a function table to their graph and examine it in search of an *x*-value that gives the same *y*-value for both functions. This point, (8, 7) is defined as the solution to this system of linear equations.
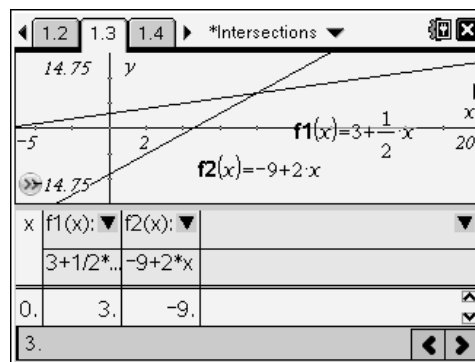
Note: when students add a function table to their graph, students will not be able to see all 3 columns because of the size of the window. The .tns file directs them to switch the page layout from a vertical to a horizontal split. Alternatively, students can adjust the width of the columns in the table to see all three columns. Press **MENU** ((menu)) and choose **Actions > Resize** and resize the columns.
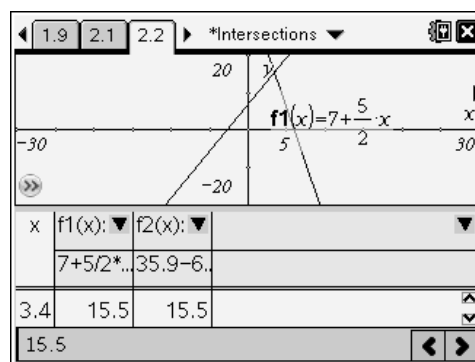
Problem 2

In this problem, students are directed to try another

system, $f1(x) = 7 + \dfrac{5}{2}x$ and $f2(x) = 35.9 - 6x$. This

time, students must adjust the table settings (press **MENU** ((menu)) and choose **Table > Edit Table Settings**) in order to find the *x*-value that gives the same *y*-value for both functions.

Students should try other systems, like **f1**(*x*) = 2*x* + 7 and **f2**(*x*) = –3 + 2*x*, as well as systems that include nonlinear functions.