Introduction to Systems of Equations

by – Eric Prowse

Activity overview

Students will get introduced to the concept of system of equations, and how we can find the solution and draw conclusions from analyzing its graphs.

Concepts

Solving systems of equations graphically.

Teacher preparation

Students will need to know some basic operations of the TI-nspire. Students should also understand how to graph linear functions, and create linear functions from a written description.

Classroom management tips

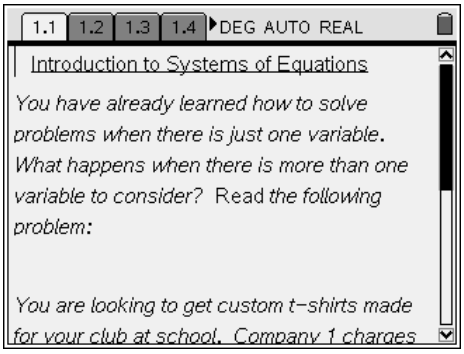
This activity is teacher centered, and should be done in a group discussion setting.

TI-Nspire Applications

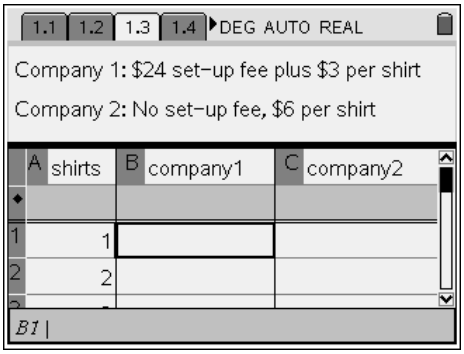
Introduction to Systems.tns

Step-by-step directions (Teacher only. Students will get a different handout)

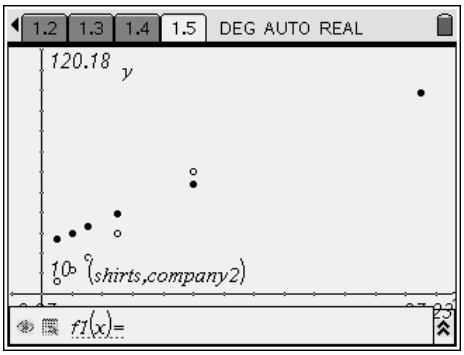
Have students open up the Introduction to Systems in their TI-nspire and read the problem that appears on their screen.



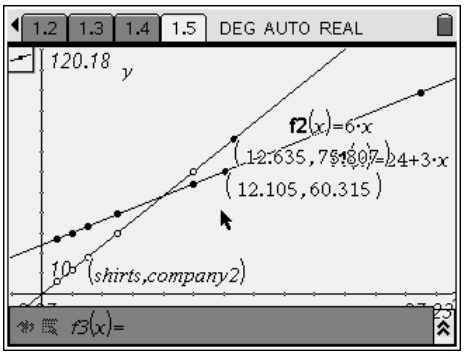
Have the students fill in the table, and then answer questions 1-4 on the student handout.



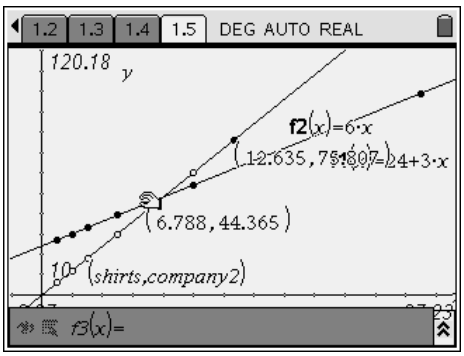
Turn to page **1.5** on the handheld to verify the equations. Have them plug their equations into the entry line to verify that their equations were correct.



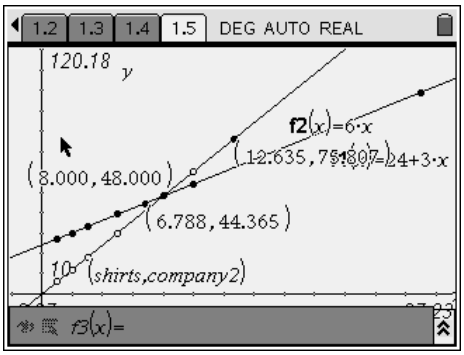
Once the equations are correct, have the students place a point on each graph by going to (menu), **6:Points & Lines**, **2:Point On**. Move the cursor to one of the lines and press (·). Do the same to the other line.



To move the points, press (esc) to end the last tool you used. Then you can move the point you just placed by moving the arrow over the point until a ☜ appears. Press and hold the (·) button until the hand closes on the point. Then you can move the point to your choosing. Click again to release the point. If you would like to enter specific values of x, double click on the x-coordinate and then enter a value of your choosing, and then press enter.



To find the point of intersection of the two graphs, press (·), **6:Points & Lines: 3:Intersection Point(s)**. Press (·) on one of the lines, then again on the other line, and then press (·) once more to place the coordinate somewhere on the screen.



Activity extensions

- *Once we complete this activity we will go into a discussion about when a system of equations has one solution, many solutions, or no solutions and represent these situations graphically.*

Student TI-Nspire Document Name : _____

You have already learned how to solve problems when there is just one unknown. What happens if there is more than one variable? Consider the following problem:

You are looking to get custom t−shirts made for your club at school. Company 1 charges a set−up fee of $24 plus $3 a shirt. Company 2 does not charge a set−up fee, but charges $6 a shirt. Make a plan for how you would choose between the two companies by opening up Introduction to Systems on your TI−*n*spire, and following the instructions on the screen.

1.) Which company is cheaper if you buy 5 shirts? Show all work comparing the cost of using both companies.

2.) Which company is cheaper if you buy 25 shirts? Show all work comparing the cost of using both companies.

3.) What is going to determine which company you decide to use? Explain why in complete sentences.

4.) Write an equation to represent the cost **y** of using Company 1 and another for Company 2 when buying **x** number of shirts. The format that you see below is used to represent a **system of equations**. Use the top entry for Company 1 and the bottom for Company 2.

$$\begin{cases} y = \\ y = \end{cases}$$

Once you have written your equations turn to page 1.4 to verify your work.

5.) Place a point on each of the lines, and then answer the questions below.

a.) What do the values of the x and y coordinates represent?

b.) Certain values of x do not apply to this problem. Think about what x represents. Give an example of a value of x that would pertain to this problem and a value that would not apply. Explain your choices.

6.) When would you use Company 1? Explain in complete sentences.

7.) When would you use Company 2? Explain in complete sentences.

8.) Find the point of intersection of the two graphs. Explain what this point means to this problem.