Solving Equations in One Variable Using Graphing Calculators

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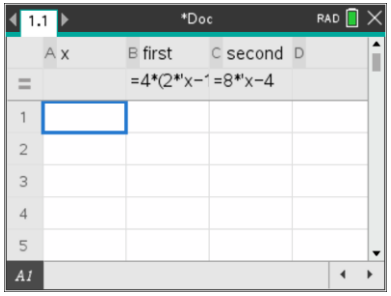
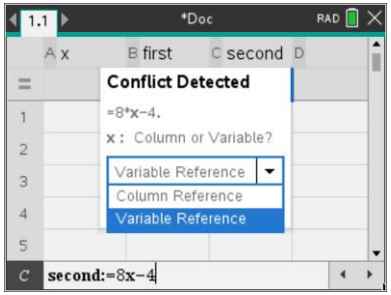
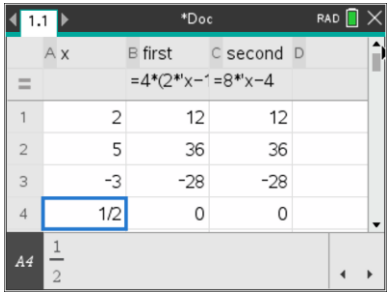
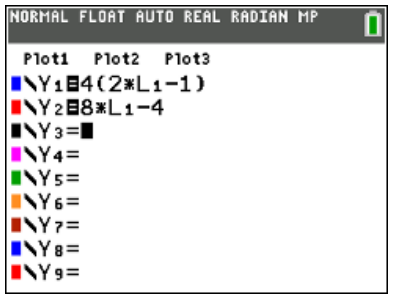
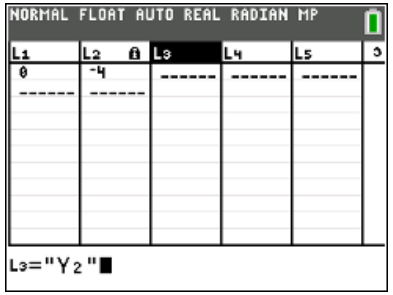
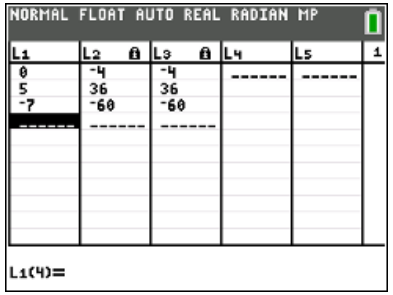
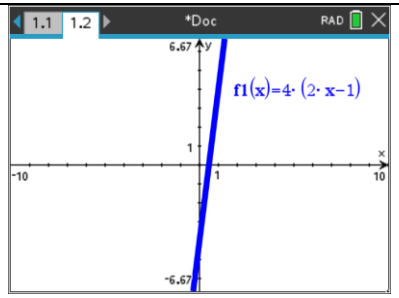
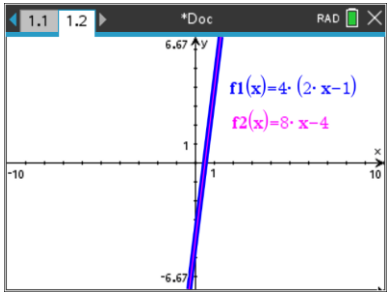
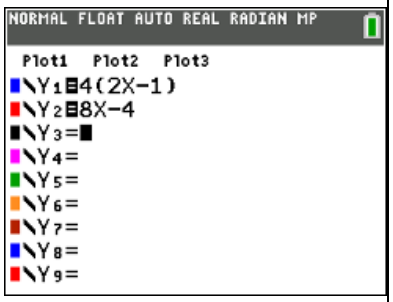
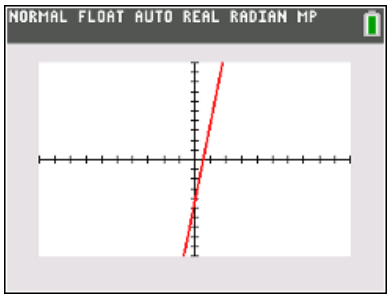
Solving Equations in One Variable Using Graphing Calculators

OBJECTIVE	USING TI-NSPIRE		USING TI-84	
Equivalent Expressions Complete the distributive property and verify the expressions are equivalent: 4(2x – 1)	Using Tables -Start by opening a List & Spreadsheet window -Title column A: X -Title column B: first -Title column C: second Below the column title is a place to enter expressions. -Expression for column B: 4(2x-1) You will be prompted to make a choice about using X, choose Variable Reference -Expression for column C: 8x-4 -Enter any value for x and IF the two expression are equivalent, columns B & C should be the same. -If expression values are not equivalent, make corrections in the functions cell and try again.	  	Using Tables -First enter the expressions in the equation editor, but the variable needs to be a column reference, we will use L_1 for our X column. Let $Y_1 = 4(2*L_1 – 1)$ Let $Y_2 = 8*L_1 - 4$ -Use STAT, EDIT to get to the tables window -In the L_1 column, enter one value -Move to the right and to the top of L_2 column -Enter "Y_1" -Move to the right and to the top of L_3 column -Enter "Y_2" Enter any other value in L_1, the expression columns should have equal values. If necessary, edit the expressions in the equation editor until you find them to be equivalent.	  

Equivalent Expressions	Using Graphs		Using Graphs	
Complete the distributive property and verify the expressions are equivalent: 4(2x – 1)	-Start in a graphing window -Graph the original expression as the first function -I would change the attributes to be a thicker line. -Graph the equivalent expression as the second function. The new line should be on top of the original line. -If lines are not coincident (concurrent), make corrections and try again.	 	-First enter the expressions in the equation editor Let $Y_1 = 4(2x – 1)$ Let $Y_2 = 8x – 4$ -Press the GRAPH button below the screen and watch the graphs appear. -If the expressions are equivalent, the graphs will be drawn in the same location (coincident lines) -If the graphs show two different lines, then the expressions are not equivalent and need to be changed in the equation editor. -Press the GRAPH button to see the changes.	 

Solving Equations with Variables on One Side

Solve: 8x – 4 = 52

Take the opportunity to have students look at the pattern in the numbers and discuss values where you see zeros

Using Tables

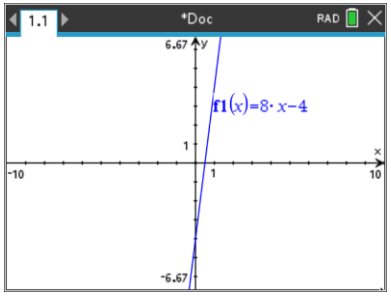
-Start by opening a graphing window and entering the variable expression as the first function

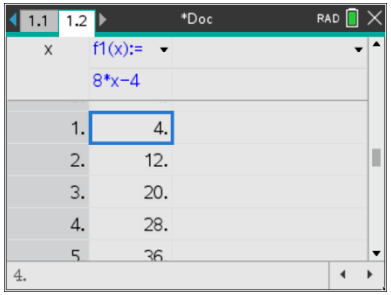
-Add a new page and make it a Lists & Spreadsheet

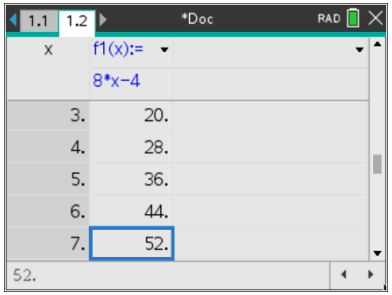
-Change the window to a Function Table and choose f1

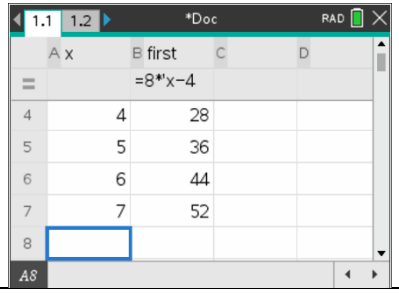
-You can scroll down (or up) to view table values
-You are looking for which x value produces 52 for the function value

-You could use the Lists & Spreadsheet window by placing the variable expression in the function cell. This will allow you to choose any x value and view the calculated output.







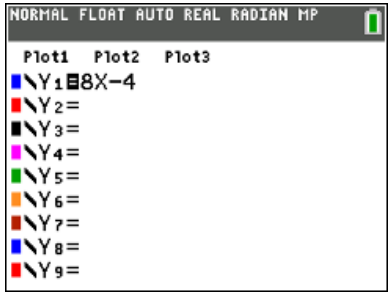


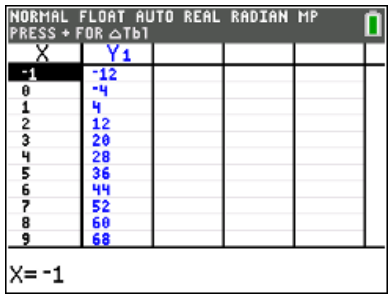
Using a Table

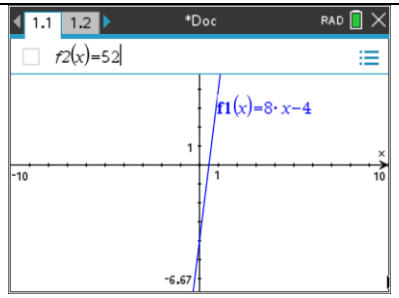
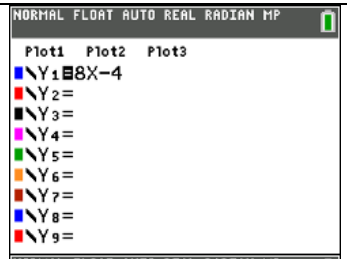
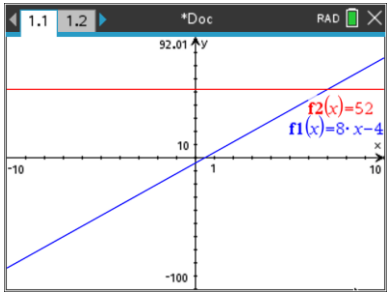
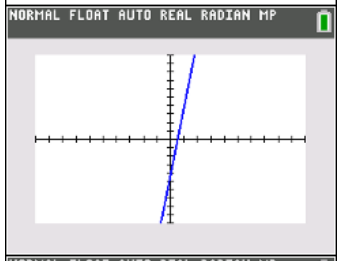
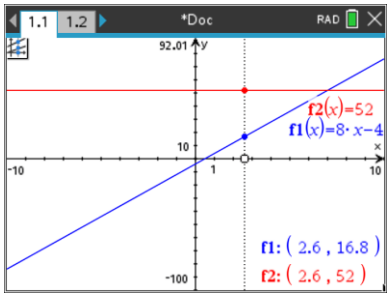
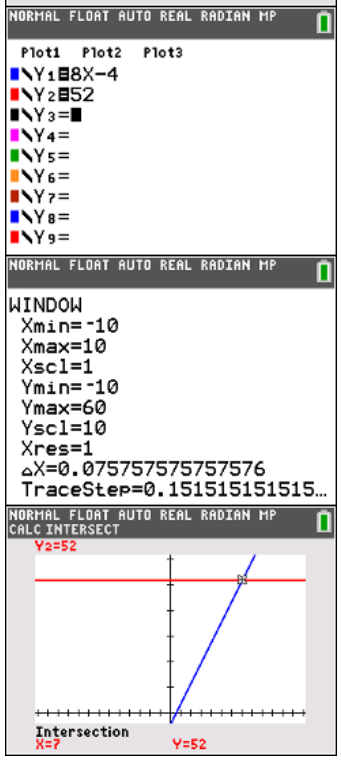
-First enter the expressions in the equation editor
Let $Y_1 = 8x – 4$

-Press ys to get to the function tables. The tables will already be complete.

-You can scroll down (or up) to view table values
-You are looking for which x value produces 52 for the function value





Solving Equations with Variables on One Side	Using Graphing		Using Graphing	
Solve: 8x – 4 = 52	-Return to the graphing window and enter a second function -This will be a constant function y = 52		-First enter the expressions in the equation editor Let $Y_1 = 8x – 4$	
This is a teaching moment for students to see functions of a constant value produce horizontal lines	-You will need to adjust the viewing window. -Time saving feature, use ZOOM FIT		-Press the GRAPH button below the screen and watch the graphs appear.	
You could talk about the changes in the coordinates as they move the trace point. Recognizing patterns is a major focus. Why not bring up the topic of SYSTEMS at this point.	-Use the TRACE ALL -Set the TRACE STEP to be .1 -Arrow to the left and right to find the point where the coordinates are the same.		-Go back to the equation editor and enter the constant. -You will need to adjust the viewing window; these are just a suggestion. -Use yr to find the option for Intersection -You will see the graph and be prompted to make choices, to find the x value of the intersection point.	

Solving Equations with Variables on Both Sides

Solve:
15x+3=2(9+6x)

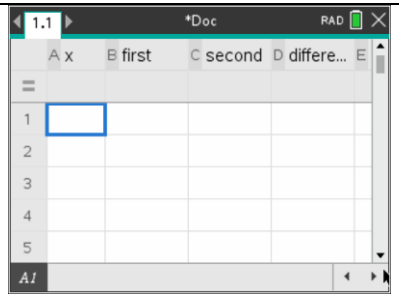
Take the opportunity to have students look at the pattern in the numbers and discuss values where you see zeros.

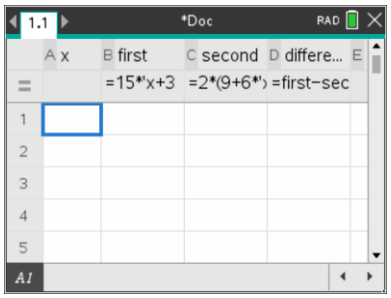
Using Tables

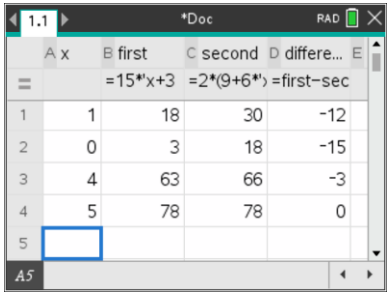
-Start with a Lists & Spreadsheet
-Title column A: X
-Title column B: first
-Title column C: second
-Title column D: difference
-Below the column title is a place to enter expressions.
-Expression for column B: 15x + 3

You will be prompted to make a choice about using X, choose Variable Reference

-Expression for column C: 2(9 + 6x)
-Expression for column D: **first-second**
-Enter any value for x.
-You are looking for the X value that makes the two expressions equivalent, where columns B & C should be the same.
-If expression values are not equivalent, choose a different x.
-You should be observing if the difference in values is approaching zero, or not, to determine your next choice for X.





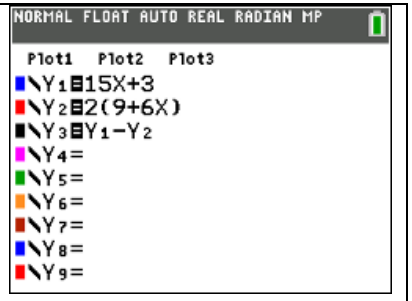


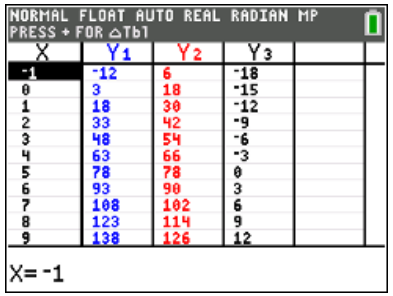
Using Tables

-First enter the expressions in the equation editor
Let $Y_1 = 15x + 3$
Let $Y_2 = 2(9 + 6x)$
AND
Let $Y_3 = Y_1 - Y_2$

-Then, go to the Table view and the values are filled in.

-Scroll up or down to see which x value produces the same value for the two expressions.
-Paying attention to the last column which is showing the difference between the expressions. The value should be zero.





Solving Equations with Variables on Both Sides

Solve:
15x+3=2(9+6x)

You could talk about the changes in the coordinates as they move the trace point. Recognizing patterns is a major focus.

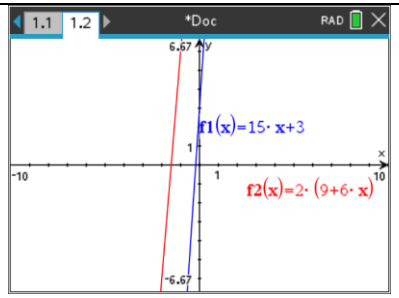
Of course, you can talk about the topic of SYSTEMS at this point.

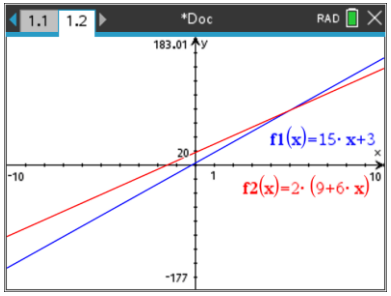
Using Graphs

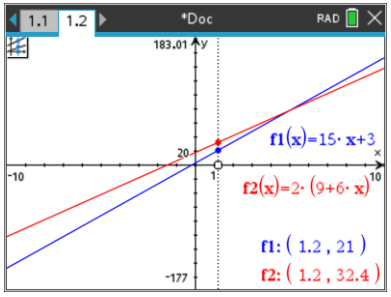
-Open a graphing window and enter the left expression as the first function
-Enter the right expression as the second function

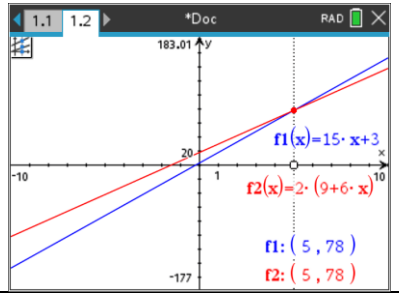
-You may need to adjust the viewing window.
-Time saving feature, use ZOOM FIT

-Use the TRACE ALL
-Set the TRACE STEP to be .1
-Arrow to the left and right to find the point where the coordinates are the same.









Using Graphs

-First enter the expressions in the equation editor
Let Y_1 = 15x + 3
Let Y_2 = 2(9 + 6x)

-Press the Graph button and watch the graphs appear.
-You may need to change window settings
-Choose Zoom Fit to save time.

-Use yr to find the option for Intersection
-You will see the graph and be prompted to make choices, to find the x value of the intersection point.