SOLVING LINEAR EQUATIONS AND INEQUALITIES IN ONE VARIABLE

Materials

- TI-Nspire™ or TI-Nspire CAS™
- Solving_Linear_Equations.tns
- TI-Nspire™ software

Mathematical Concepts

Solving equations
- Intersection points
- Linear
- One variable equations vs. inequalities

Overview

Students who have had prior experience with any TI (handheld or computer) will learn to use TI-Nspire™ more easily than others. It is important that you master some basic skills in order to facilitate learning. This lesson covers using the nspires' basic functions as we explore linear equations/inequalities.

Classroom Setup

Students can work alone or in groups of two with one answering questions on paper and the other one using the calculator.

Introduction

The following activity introduces the new TI-nspire as you solve equations using graphing. You will explore methods that help to solve one-variable equations/inequalities using visual representations.

Getting Started.

1. Once the file is downloaded you can open the new document by pressing (⌂) Home and selecting ⟨5⟩ MY Documents, (See Figure 1).

2. *If it is not downloaded you will have to do so before progressing.*

2a. Move to the next page using (ctrl) CTRL **NAVPad**(☼) right wheel. Read the lesson objectives.

Think First. Write each statement in a complete sentence.

3. If $y = 2x-4$ and $y = 4x +1$, then create a one-variable equation using substitution.

_____

4. Insert a graph page by clicking using (⌂) and then select ⟨2⟩

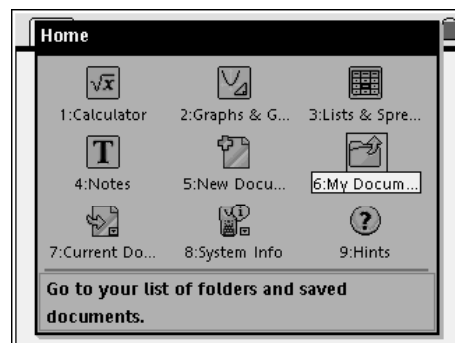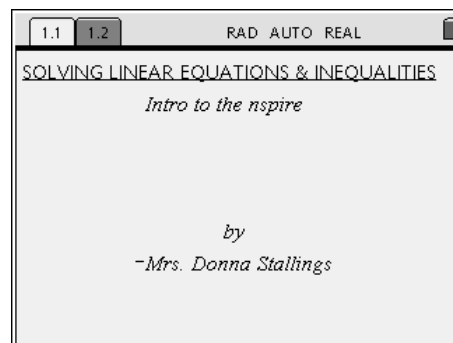**Figure 1**

Figure 2

5. Move your cursor, using the NAVPAD, to the equation line and insert y= 2x-4 for f1(x), click enter. Your line should appear in the window.

6. Click (menu) (6)(3) (MENU, 6, 3) to find the point where the line intersects with the y-axis. (See Figure 5).

Use your NAVPAD to highlight the line

y=2x-4. Click enter and then highlight the y-axis, click enter.

7. A point should appear where the two lines meet. To find the exact coordinates, click (MENU, 1, 6) (menu) (1)(6). Now move the cursor over the point and a shadow of the point should appear. Click enter twice. What is this point called? What are the coordinates?

8. What is significant about all coordinates of x-intercepts?

Now, click (menu) (2) (5) (MENU, 2, 5) to insert a function table. Use the function table to help you find the x-intercept. (See Figure 6)

What are the coordinates of the x-intercept?

Investigating Equation #2:

Click ctrl TAB (Figure 7) until the graphing area is highlighted. Use the NAVPAD to move to the function area. Hit enter. Insert a new function f2(x) = 4x + 1. Your table should now include values for f2(x).

Use the table to find the x and y intercepts of this

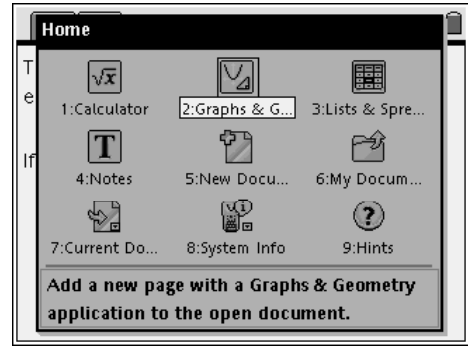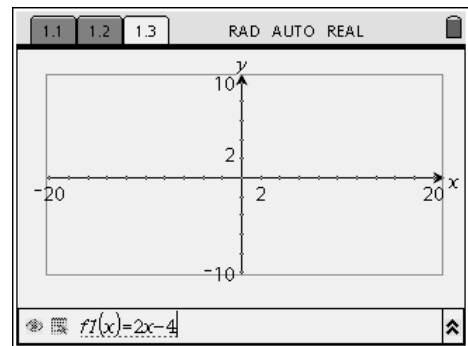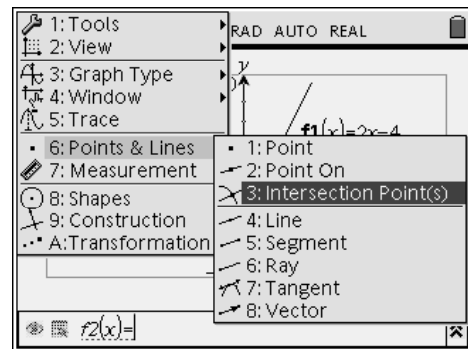**Figure 3**

Figure 4
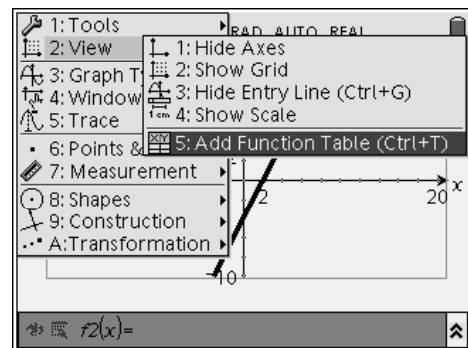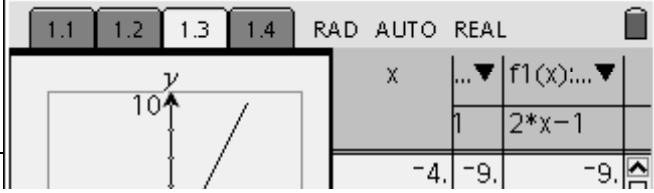

Figure 5

Figure 6

equation.

x-intercept: _____ _____

y-intercept:_____ _____

$$f1(x) = 2x-4 \qquad f2(x)=4x+1$$

4. To determine where the lines meet or where the expressions are equal, we must find a point on the coordinate plane where the value for x produces the same value for y for both equations. Use either the Points and Lines, Intersection steps (see Figure 5) or observe the table and find this unique point.

5. _____is the point of intersection because
   _____
   _____
   _____
   _____
   _____.

Figure 7

Problem #2

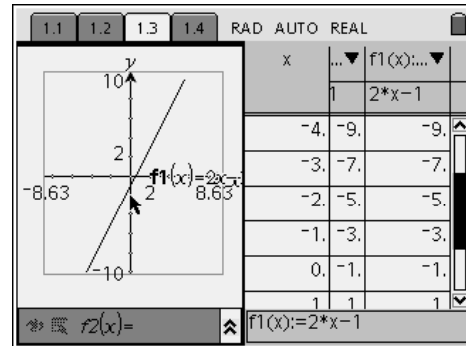**To insert a new problem.** (ctrl)(⌂), EDIT, INSERT PROBLEM)

Notice that the page you are now on is 2.1

1. Given 2x -1 = 3x + 9, find the two functions that make up this one –variable equation.

f1(x) = _____

f2(x) = _____

2. Insert a new coordinate plane, Click (⌂) ((menu)) and then select (2), and graph the two lines. Find the intercepts and the point of intersection or solution to the equation: 3x + 9 = 2x - 1

Functions	x- intercept	y-intercept	Solution
F1(x)			
F2(x)			

3. What is the difference between the point of intersection and the solution to the one-variable equation?

4. How are these two answers the same? Different?

Problem # 3: Insert a new problem page. (See Problem #2 if you have forgotten how)

1. What would inequality$_1$ and inequality$_2$ be if $2x - 4 < 6$? Complete below.

Y < _____

__>_____

2. Graph $2x – 4 < 6$ in two inequalities. Where would the solution to this inequality lie on the coordinate plane?

| Solve 2x-4 < 6 by hand. |

3. How is the solution $\{x \mid x < 5\}$ similar to the graphical solution?

| Draw a sketch of the solution to the inequalities. |

3. How could you describe this region using algebraic inequalities?