

# Activity 6

## Graphing Linear Equations

### TEACHER NOTES

**Topic Area: Algebra**

**NCTM Standard:** Represent and analyze mathematical situations and structures using algebraic symbols

**Objective:** The student will be able to utilize the Casio fx-9750G Plus calculator to graph linear equations in the various activities included in this unit.

**Introduction:** In this activity, the student will learn to use the basic graphing capabilities of the Casio fx-9750G Plus and also to discover the meaning of many of the graphing terms.

The student should know the following vocabulary:

Coordinates

Horizontal Line

Origin

Slope

Vertical Line

X-axis

X-intercept

Y-axis

Y-intercept

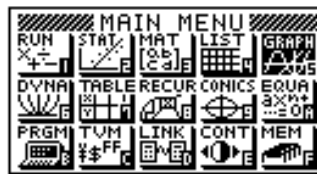
# Calculator Notes for Activity 6

## Objective

The student will be able to utilize the Casio fx-9750G Plus calculator to graph linear equations in the various activities included in this unit.

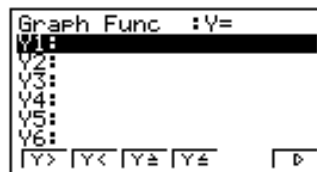
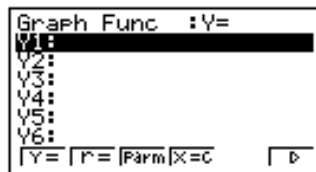
## Steps for Graphing

1. Turn the calculator on. From the Main Menu, use the arrow keys to highlight the **GRAPH** Menu, and then press **EXE**.



If equations are filled in the screen, they must be deleted to look like the screen above. Omit the data by pressing **F2** (DEL) and then **F1** (YES).

Notice at the top right side of the screen, you should see  $Y=$  . This means that to graph an equation, it must be written in y form (the equation starts as  $y =$  ). At the bottom of the screen, you should see the word TYPE. Press **F3** (TYPE). This will give you more choices of equations. Remember, the arrow at the far right means there are more choices if you press **F6**. When you press **F6**, another arrow is above the **F6**. If you press **F6** again, you will return to the original choices. The screens are as follows:



In the first screen, press **F1** (Y =). This will return you to the second screen at the top of page 2 in Step 1. Use the arrow keys to scroll down the screen. Notice that you are able to enter 20 different equations into the calculator. Scroll the highlighting back to **Y1**:

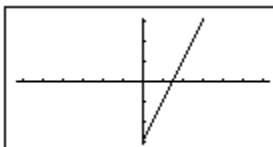
2. Enter the following equation:

$$y = 2x - 3$$

To do this, press 2, the **X,0,T** Key, - (the subtraction key), 3, **EXE**. Your screen should look like the following screen.



3. At the bottom right of the screen, you will see the word DRAW. This command will graph this equation. To do this, press **F6** (DRAW).



4. Look at the x and y axes on the screen above. Notice that the x-axis has 6 notches to the right of origin and 6 notches to the left of origin. The y-axis has 3 notches up and 3 notches down from origin. This is the normal display for the initial view window (INIT). The view windows can be changed. To do this, press **SHIFT**, then **F3**.



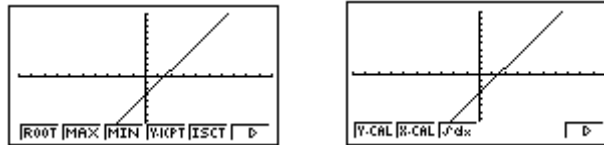
The standard screen (STD), sets the x-axis from -10 to +10 and the y-axis from -10 to +10. To do this, press **F3**.



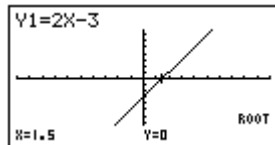
The view window can be set to any units you want. We will leave it set to STD. To get back to your graph, press **EXIT**, then press **F6**.



5. The Casio fx-9750G Plus calculator has an easy method for finding the x-intercept and y-intercept. Press **SHIFT**, then press **F5**. Notice the arrow at the bottom right, remember this means there are more choices. Press **F6** to see the other choices and **F6** again to get back to the original choices. The two screens are shown below.

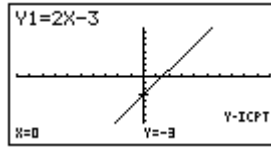


These screens are called the **G-Solv** screens. To get the x-intercept, you will use **F1** (**ROOT**). To find the y-intercept, you will use **F4** (**Y-ICPT**). First, press **F1** to get the x-intercept. The black box in the upper right corner means that the calculator is looking for the x-intercept. Watch at the bottom left of the line, you will eventually see a cursor appear and work its way up the line until it finds the x-intercept. When it reaches the intercept, it will stop and display the screen below.



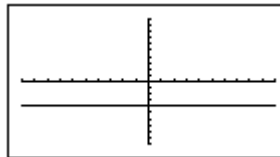
The bottom of this screen gives the coordinates of the x-intercept,  $x = 1.5$  and  $y = 0$ . In other words, the x-intercept is the coordinate,  $(1.5, 0)$ .

To find the y-intercept, press **SHIFT**, then press **F5** (G-Solv) to return to the other screen. Now, press **F4** to get to the y-intercept. The calculator will go through the same process as before to find the y-intercept and then it will stop at the screen below.



Notice, the bottom of the screen displays the coordinates for the y-intercept,  $(0, -3)$ .

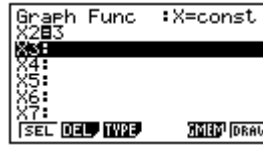
- This calculator can also graph vertical and horizontal lines. First, we will look at horizontal lines. Remember, a horizontal line is represented with  $y = a$  constant. To make the horizontal line cross the y-axis at  $-4$ , you will enter the equation  $y = -4$ . To do this, press **EXIT** to get back to the graph screen. Press **F2**, then **F1** to delete the equation you previously graphed. Enter  $-4$ , then press **EXE**, then press **F6**.



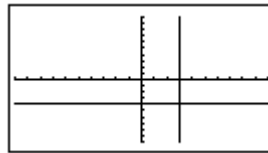
To graph a vertical line that crosses the x-axis at  $+3$ , you will enter the equation  $x = 3$ . To do this, press **EXIT** to return to the graph screen. We will leave the horizontal line on the calculator and just add our vertical line. Notice the cursor is on the second equation but the second equation is set for  $y =$ . This means you will have to change the type of equation to  $X =$ . To do this, press **F3** (TYPE), then **F4** ( $X = C$ ). You will see the screen change to the screen below.



Now enter **3**, and press **EXE**.



Press **F6** (**DRAW**), to display the graph. Notice that the calculator draws the horizontal line first, since we entered it first and then it draws the vertical line on the same screen.



You can draw up to 20 different graphs on the same screen.

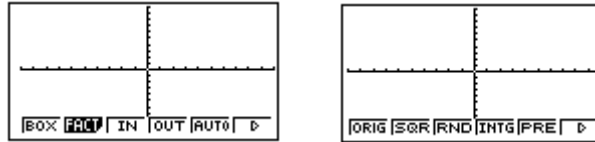
Before starting a new graph, be sure to delete the old equations and always return the type back to  $y =$ .

7. Not always will your graph be displayed on the screen. It is possible for your graph to be located outside your view screen which means you will need to find it first. Since you will be finding both the  $x$  and  $y$ -intercepts in this activity, you will need to see where the line crosses over both axes. Start this part by graphing the following equation

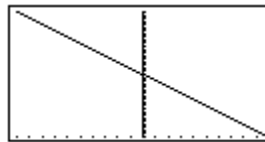
$$y = -2x + 450$$

To do this, make sure your view window is set to **STD**. To enter the equation, press **EXIT** and delete all equations that are entered. Put the cursor on **Y1** and enter the equation by pressing **(-)**, **2**, **(X,θ,T)**, **+**, **4**, **5**, **0**, **EXE**. Press **F6** (**DRAW**) to graph the equation. Notice that the screen is blank which means that you need to find it. To help find the graph, the Casio **fx-9750G Plus** calculator will find the  $y$ -intercept for you, then all you will need to do is zoom out until you see both intercepts. To do this, start by pressing **F2** to take you to the **Zoom**

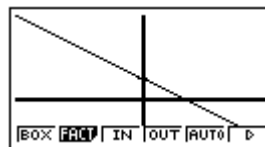
function. You will see the following choices at the bottom of this screen. Press F6 to see more choices and F6 again to return to your original choices.



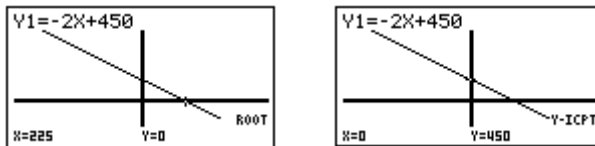
Press **F5** (AUTO) to find the y-intercept. You will see the following screen.



To find the x-intercept, press **F2** to get your choices back and then F4 to Zoom OUT. You will need to press the F4 button 6 times. You will start to see the x-axis on the 5<sup>th</sup> press but press 6 times to get a better view. You should see the screen below.



To get the x and y intercept, follow the same steps as you did in Step 5 using the **G-Solv**. You should see the screens below.



From the first screen, the x-intercept is at the coordinate (225, 0) and from the second screen, the y-intercept is at (0, 450).

When using the Zoom function it will be necessary to be sure to delete the old equations and to reset the view window to STD before starting another equation.

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

## Activity 6: Worksheet Graphing Linear Equations

Graph the following equations, then determine the x-intercept and y-intercept.

1.  $y = 3x - 21$

2.  $y = -3x - 21$

3.  $y = 4x + 14$

4.  $y = \frac{1}{2}x + \frac{3}{4}$

5.  $y = -\frac{2}{3}x - \frac{1}{4}$

6.  $y = -3.456x + 2.6$

7.  $y = 4.65x + 25.6$

8.  $y = 19.3x - 425$

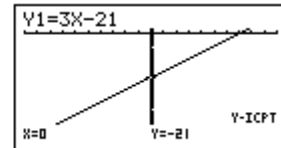
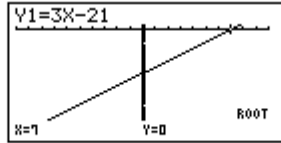
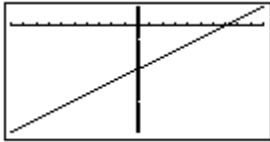
Graph the following equations on the same screen.

9.  $y = 3$  and  $x = -2$

10.  $y = 3x - 2$  and  $x = 5$  and  $y = -2x + 6$

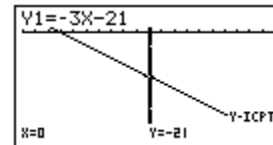
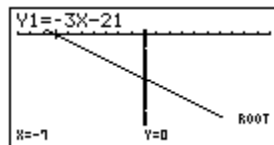
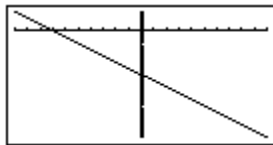
## Solutions to Activity 6 Worksheet

1.



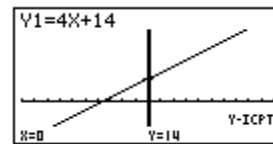
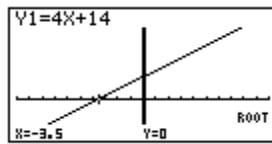
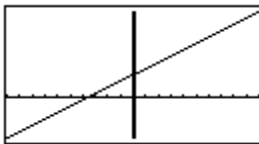
X-INTERCEPT = (7, 0); Y-INTERCEPT = (0, -21)

2.



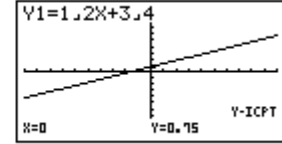
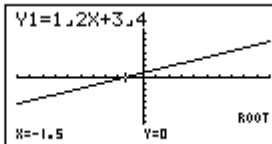
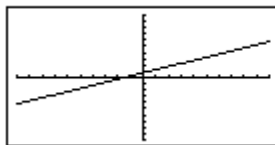
X-INTERCEPT = (-7, 0); Y-INTERCEPT = (0, -21)

3.



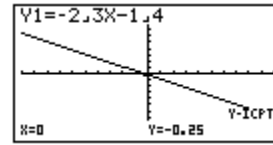
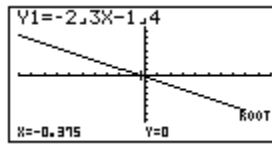
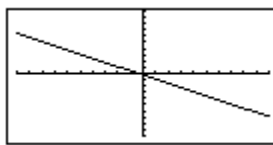
X-INTERCEPT = (-3.5, 0); Y-INTERCEPT = (0, 14)

4.

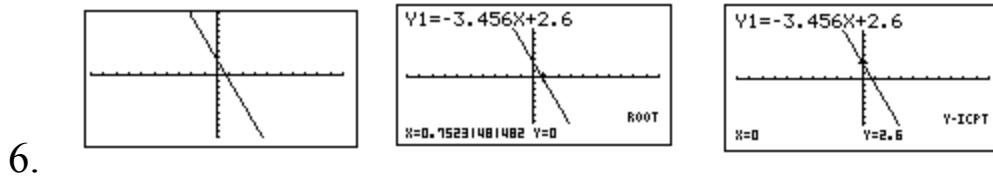


X-INTERCEPT = (1.5, 0); Y-INTERCEPT = (0, 0.75)

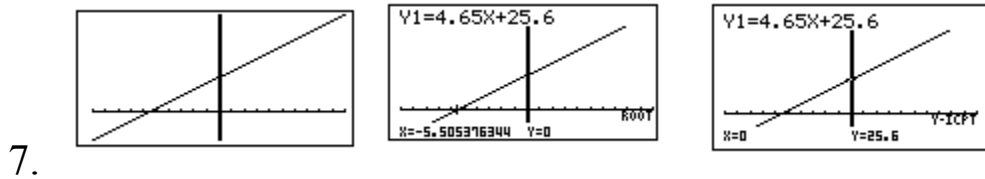
5.



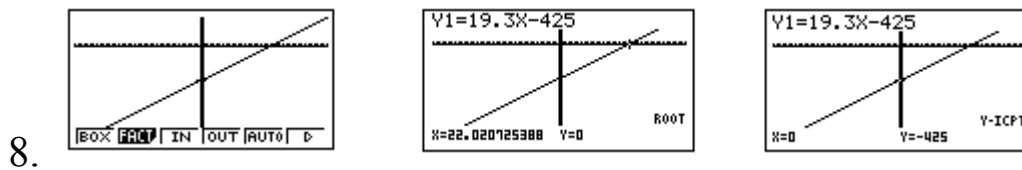
X-INTERCEPT = (-0.375, 0);  
Y-INTERCEPT = (0, -0.25)



X-INTERCEPT = (0.75331481482, 0)  
 Y-INTERCEPT = (0, 2.6)



X-INTERCEPT = (-5.505376344, 0)  
 Y-INTERCEPT = (0, 25.6)



X-INTERCEPT = (22.020725388, 0)  
 Y-INTERCEPT = (0, -425)

