

Graphing Technology Lab

Graphing Linear Functions

Casio FX-9750G

The power of a graphing calculator is the ability to graph different types of equations accurately and quickly. By entering one or more equations in the calculator you can view features of a graph, such as the x -intercept, y -intercept, the origin, intersections, and the coordinates of specific points. Now we will look at how to graph a linear equation.

Often linear equations are graphed in the standard viewing window. The **standard viewing window** is $[-10, 10]$ by $[-10, 10]$ with a scale of 1 on each axis. To quickly choose the standard viewing window on a Casio FX-9750G, press **SHIFT** **F3** **F3**.

ACTIVITY 1 Graph a Linear Equation

Graph $3x - y = 4$.

Clear the calculator memory first.

Select **MEM** from the main menu **▼** **Reset** **F1** **MENU**.

Step 1 Enter the equation in the **Graph Func** list.

- The **Graph Func** list shows the equation or equations that you will graph.
- Equations must be entered with the y isolated on one side of the equation. Solve the equation for y , then enter it into the calculator.

$$3x - y = 4 \quad \text{Original equation}$$

$$3x - y - 3x = 4 - 3x \quad \text{Subtract } 3x \text{ from each side.}$$

$$-y = -3x + 4 \quad \text{Simplify.}$$

$$y = 3x - 4 \quad \text{Multiply each side by } -1.$$

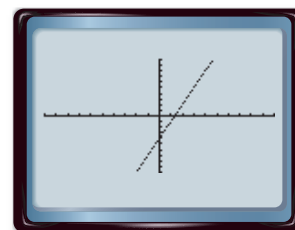
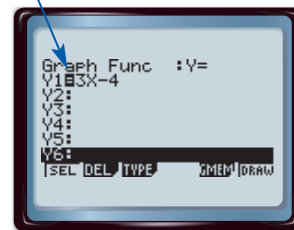
From the main menu, select **GRAPH**. On the **Y1** line enter the following.

KEYSTROKES: 3 **X,θ,T** **-** 4 **EXE**

Step 2 Graph the equation in the standard viewing window.

KEYSTROKES: **SHIFT** **[V-Window]** **F3** **EXE** **F6**

The equals sign appears shaded for graphs that are selected to be displayed.



$[-10, 10]$ scl: 1 by $[-10, 10]$ scl: 1

Sometimes a complete graph is not displayed using the standard viewing window. A **complete graph** includes all of the important characteristics of the graph on the screen. These include the origin and the x - and y -intercepts. Note that the graph above is a complete graph because all of these points are visible.

When a complete graph is not displayed using the standard viewing window, you will need to change the viewing window to accommodate these important features. Use what you have learned about intercepts to help you choose an appropriate viewing window.

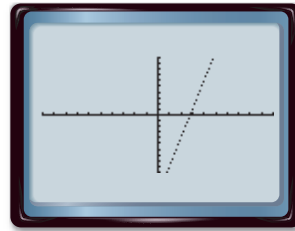
ACTIVITY 2 Graph a Complete Graph

Graph $y = 5x - 14$.

Step 1 Enter the equation in the Graph Func list and graph in the standard viewing window.

- Clear the previous equation from the Graph Func list. Then enter the new equation and graph.

KEYSTROKES: **SHIFT** **[G↔T]** **▲** **F2** **F1** 5 **X,θ,T** **-** 14
EXE **F6**



$[-10, 10]$ scl: 1 by $[-10, 10]$ scl: 1

Step 2 Modify the viewing window and graph again.

- The origin and the x -intercept are displayed in the standard viewing window. But notice that the y -intercept is outside of the viewing window.

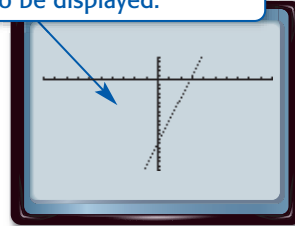
Find the y -intercept.

$$\begin{aligned} y &= 5x - 14 && \text{Original equation} \\ &= 5(0) - 14 && \text{Replace } x \text{ with } 0. \\ &= -14 && \text{Simplify.} \end{aligned}$$

Since the y -intercept is -14 , choose a viewing window that includes a number less than -14 . The window $[-10, 10]$ by $[-20, 5]$ with a scale of 1 on each axis is a good choice.

KEYSTROKES: **SHIFT** **[V-Window]** **▼** **▼** **▼** **(-)** 20 **EXE** 5 **EXE** **EXE** **F6**

This window allows the complete graph, including the y -intercept, to be displayed.



$[-10, 10]$ scl: 1 by $[-20, 5]$ scl: 1

Exercises

Use a graphing calculator to graph each equation in the standard viewing window. Sketch the result.

1. $y = x + 5$

2. $y = 5x + 6$

3. $y = 9 - 4x$

4. $3x + y = 5$

5. $x + y = -4$

6. $x - 3y = 6$

Graph each linear equation in the standard viewing window. Determine whether the graph is complete. If the graph is not complete, choose a viewing window that will show a complete graph and graph the equation again.

7. $y = 4x + 7$

8. $y = 9x - 5$

9. $y = 2x - 11$

10. $4x - y = 16$

11. $6x + 2y = 23$

12. $x + 4y = -36$

Consider the linear equation $y = 3x + b$.

13. Choose several different positive and negative values for b . Graph each equation in the standard viewing window.

14. For which values of b is the complete graph in the standard viewing window?

15. How is the value of b related to the y -intercept of the graph of $y = 3x + b$?