

Solving a System of Equations by Graphing

Tutorial Overview

In this tutorial, you will learn how to graphically solve a system of equations with the TI-Nspire™ CX. Follow the steps below to solve problems like the example below from the [2023 STAAR Algebra 1 Released Test](#) (item 23):

What is the solution to this system of equations?

$$-3x + 5y = 21$$

$$6x - y = -15$$

Ⓐ (2, 27)

Ⓑ (-2, 3)

Ⓒ (2, 0)

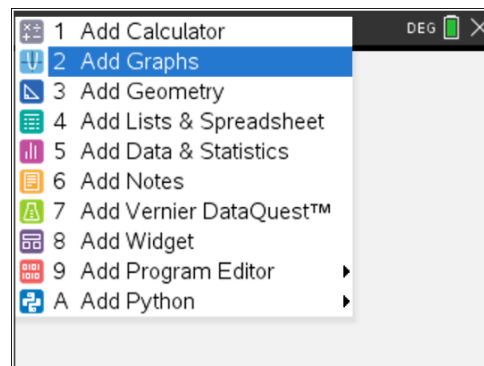
Ⓓ (-3, -3)

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Solving a System of Equations using the Intersection Tool

Step 1: Create a Graphs application page.

Press **C** , select **1 New Document**, and **2 Add Graphs**.



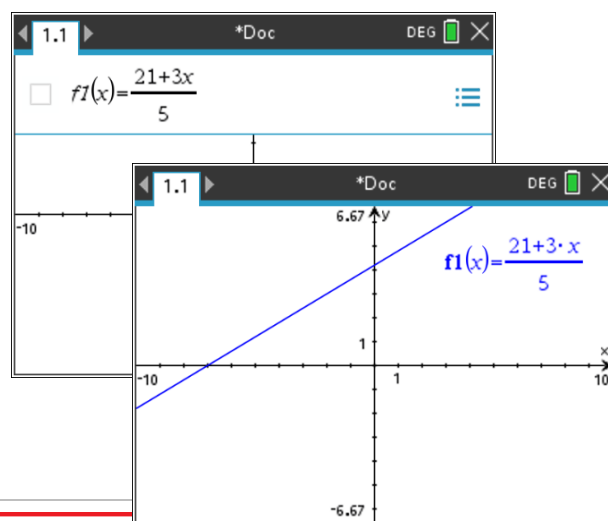
Step 2: Enter the first equation.

To graph the equation $-3x + 5y = 21$, first solve for y .

- Add $3x$ to both sides: $5y = 21 + 3x$
- Divide both sides by 5: $y = \frac{21+3x}{5}$

Press **/** **p** to set up the fraction in $f1(x)=$.

Enter $\frac{21+3x}{5}$ and press **.** to view the graph.



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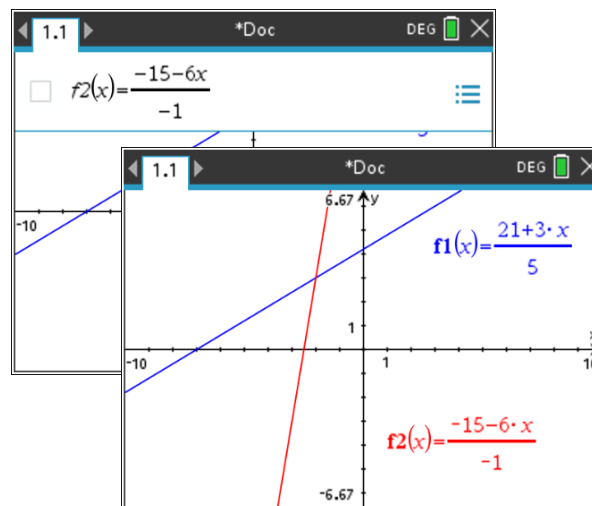
Step 3: Enter the second equation.

To graph the equation $6x - y = -15$, first solve for y .

- Subtract $6x$ from both sides: $-y = -15 - 6x$
- Divide both sides by -1 : $y = \frac{-15-6x}{-1}$

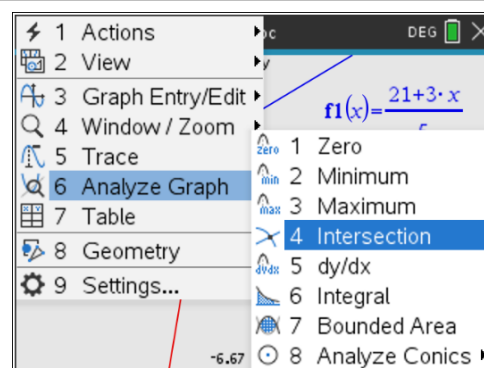
Press **e** then **/** **p** to set up the fraction in $f2(x)=$.

Enter $\frac{-15-6x}{-1}$ and press **·** to view the graph.



Step 4: Select the intersection tool.

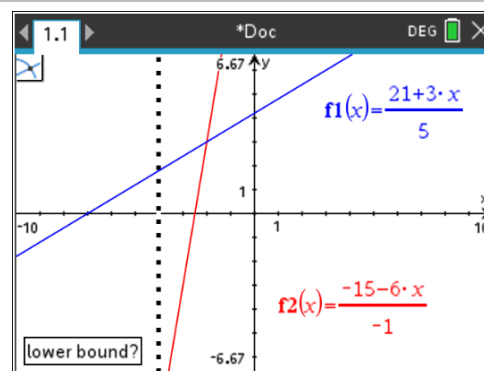
Press **b**, **6 Analyze Graph**, and **4 Intersection**.



Step 5: Mark the lower bound.

Using the touchpad, move the cursor tool, \emptyset , to the left side of the intersection point. A vertical dashed line will move with the cursor. Alternatively, you may type in a lower bound value rather than using the touchpad.

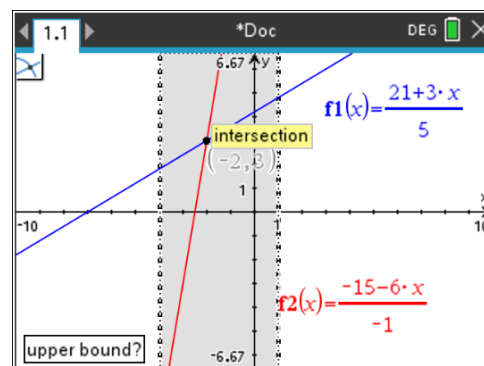
Press the center of the touchpad, **x**, or **·** to mark the lower bound.



Step 6: Mark the upper bound.

Using the touchpad, move the cursor tool, \emptyset , to the right side of the intersection point. Another vertical dashed line will move with the cursor and shade the area between the lower bound and upper bound grey. Alternatively, you may type in an upper bound value rather than using the touchpad.

Press the center of the touchpad, **x**, or **·** to mark the upper bound.



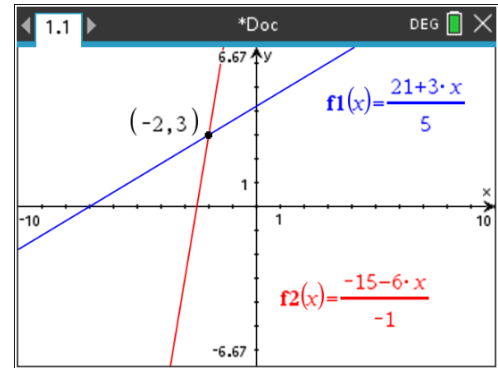
The point of intersection and its coordinates will be displayed.

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Step 7: Interpreting the solution.

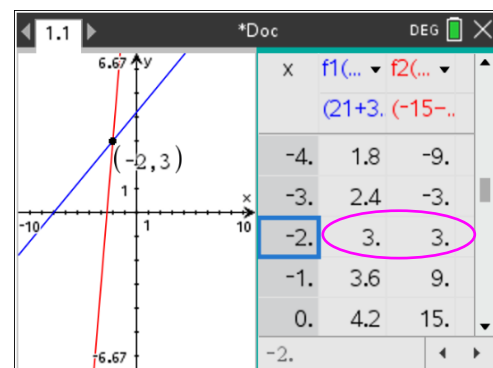
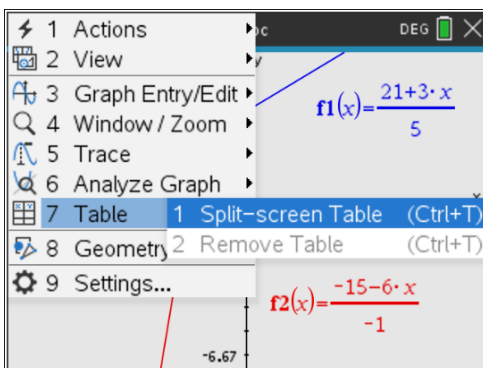
The solution to the system is the intersection point $(-2, 3)$. This means that when the x -value is -2 , **both** equations have a y -value of 3 .



Step 8: Verifying the solution.

Press **b**, **7 Table**, **1 Split-screen Table** or **/T** to view a table of values for both equations.

The table verifies that both functions have the same y -value of 3 when the x -value is -2 .



The answer to the question is answer choice B.

What is the solution to this system of equations?

$$-3x + 5y = 21$$

$$6x - y = -15$$

(A) $(2, 27)$

(B) $(-2, 3)$

(C) $(2, 0)$

(D) $(-3, -3)$

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