

Day 2 – Solving a Linear System by Graphing

- Step 1: Write each equation in slope intercept form ($y = mx + b$).
- Step 2: Graph both equations in the same coordinate plane.
- Step 3: Estimate the coordinates of the point of intersection.
- Step 4: Check whether the coordinates give a true solution by substituting them into each equation of the original linear system.

Example: Use the graph and check method to solve the linear equations.

A. $y = x - 2$ $y = -x + 4$

$m = \frac{1}{1} \rightarrow \frac{-1 \downarrow}{1 \leftarrow} = -1$

$m = \frac{-1}{-1} \rightarrow \frac{1 \uparrow}{-1 \leftarrow} = -1$

$y = x - 2$
 $1 = 3 - 2$
 $1 = 1 \checkmark$

$y = -x + 4$
 $1 = -(3) + 4$
 $1 = -3 + 4$
 $1 = 1 \checkmark$

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

$m = \frac{-1 \downarrow}{2 \leftarrow} = -\frac{1}{2}$

$m = \frac{1 \uparrow}{4 \leftarrow} = \frac{1}{4}$

$y = -\frac{1}{2}x - 1$
 $-3 = -\frac{1}{2}(4) - 1$
 $-3 = -2 - 1$
 $-3 = -3 \checkmark$

$y = \frac{1}{4}x - 4$
 $-3 = \frac{1}{4}(4) - 4$
 $-3 = 1 - 4$
 $-3 = -3 \checkmark$

C. $y = -3x + 6$ $y = x - 2$

$m = \frac{-3 \downarrow}{1 \leftarrow} = -3$

$m = \frac{1 \uparrow}{1 \leftarrow} = 1$

$y = -3x + 6$
 $0 = -3(2) + 6$
 $0 = -6 + 6$
 $0 = 0 \checkmark$

$y = x - 2$
 $0 = 2 - 2$
 $0 = 0 \checkmark$

D. $y = -2$ $4x - 3y = 18$

$m = 0$

$m = \frac{-4 \uparrow}{3 \leftarrow} = -\frac{4}{3}$

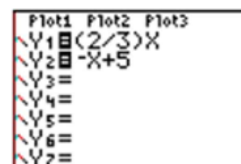
$y = -2$
 $-2 = -2 \checkmark$

$4x - 3y = 18$
 $4(3) - 3(-2) = 18$
 $12 + 6 = 18$
 $18 = 18 \checkmark$

Using a Graphing Calculator to Solve a Systems of Equations

Use a graphing calculator to solve the following systems of equations: $y = \frac{2}{3}x$
 $y = -x + 5$

1. Hit **Y =** and enter the first equation into y_1 and the second equation into y_2 (as shown on the right)

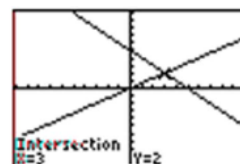


2. Hit **Graph** (Hit **Zoom**, then **6** to get back to a standard viewing window, if necessary).

3. To find the solution, hit **2nd**, followed by **Trace** (you really want the Calc feature), followed by **5: Intersect**

4. The calculator will say:
 First Curve: Make sure cursor is on one of the lines, hit **Enter**
 Second Curve: Make sure cursor moved to second line, hit **Enter**
 Guess: hit **Enter**

5. The point of intersection will be named at the bottom of the screen (as shown to the right).



6. You can also use the table on the graphing calculator to find the solution as well by hitting **2nd** followed by **Graph** (you really want the Table feature). Scroll through the table until you find where the y_1 and y_2 values are the same.

Systems of Equations Graphic Organizer

		Number of Solutions		
		1 Solution	Infinitely Many Solutions	No Solution
Solving Methods	Graphing	<p>When graphed, the 2 lines intersect once.</p>	<p>When graphed, the 2 lines lie on top of one another.</p>	<p>When graphed, the 2 lines are strictly parallel.</p>
	Substitution	When using either substitution or elimination, you should get a value for either x or y . You should be able to find the other value by substituting either x or y back into the original equation.	When using either substitution or elimination, you will get an equation that has no variable and is always true.	When using either substitution or elimination, you will get an equation that has no variable and is never true.
	Elimination		For example: $2=2$ or $-5=-5$	For example: $0=6$ or $-2=4$