2-2: Systems of Equations

Objectives: I can identify how many solutions a system has by looking at a graph

I can use a graph calculator to graph equations

I can verify a solution to a system algebraically and graphically

Vocabulary

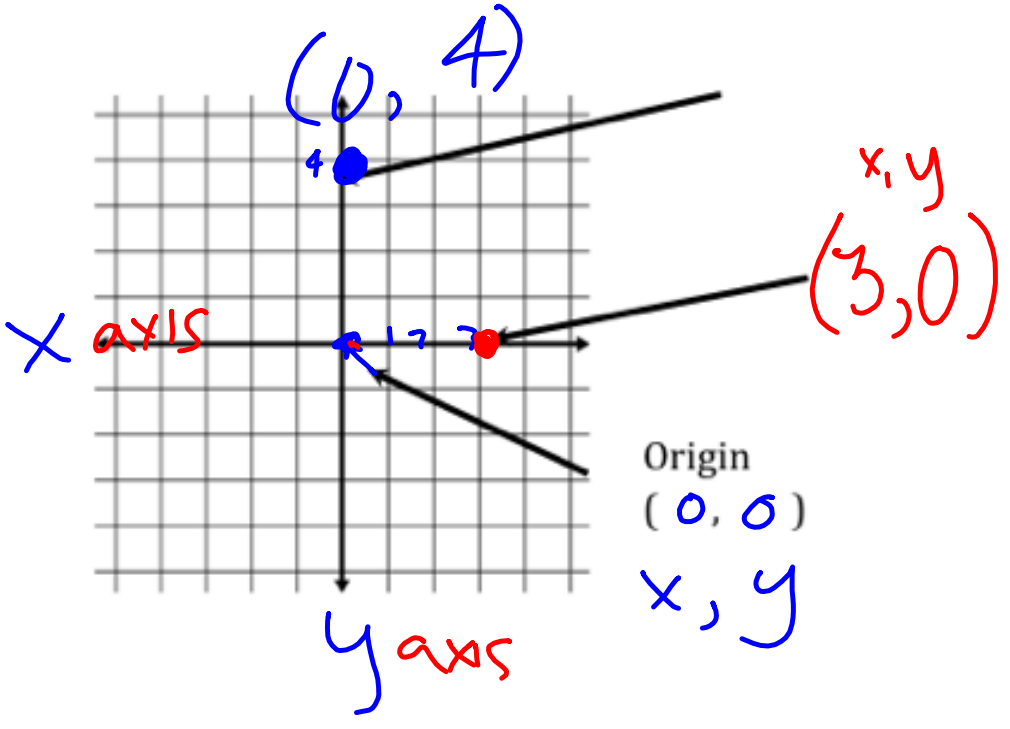
System of equations: 2+ more equations/graphs

Ordered pair: (x, y)

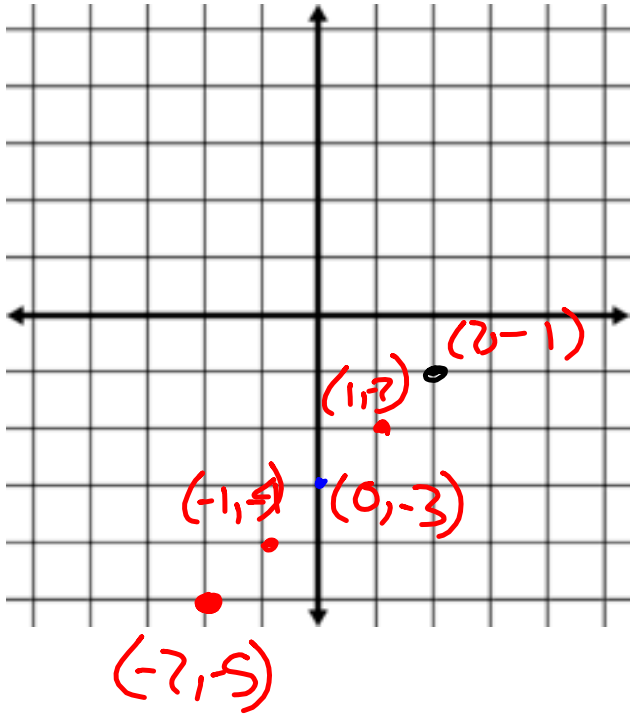
No solution: No x or y satisfies equation (graphs never cross)

Infinitely many solutions: All x or y satisfy equations (graphs are the same line)

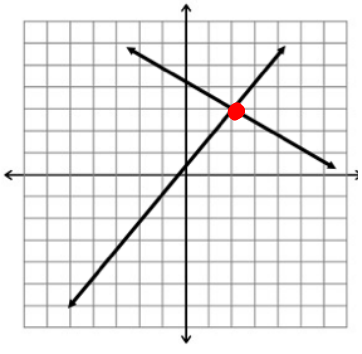
Ordered Pair Review



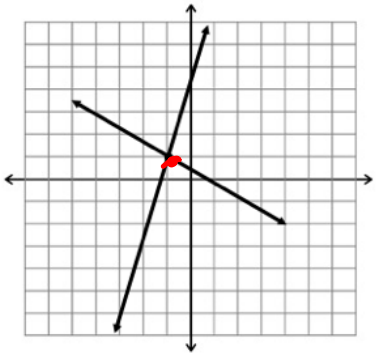
Plot the points (-2, -5), (-1, -4), (0, -3), (1, -2), (2, -1)



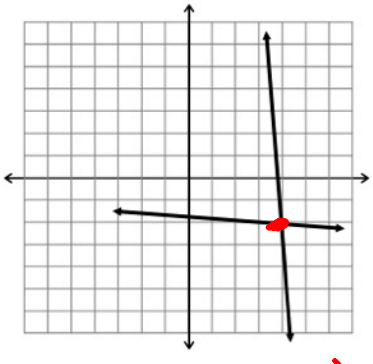
Identify the ordered pair where the two lines intersect



(2,3)



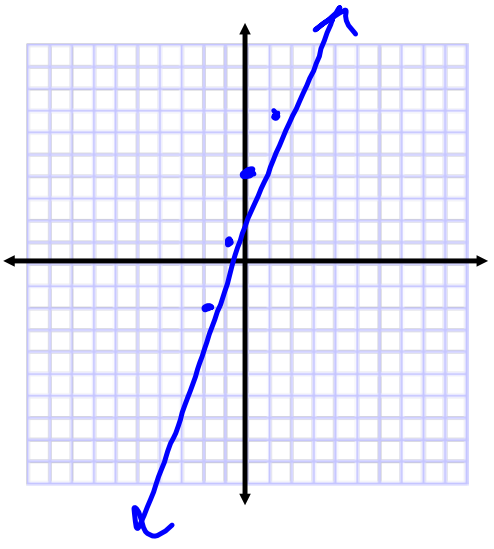
(-1,1)



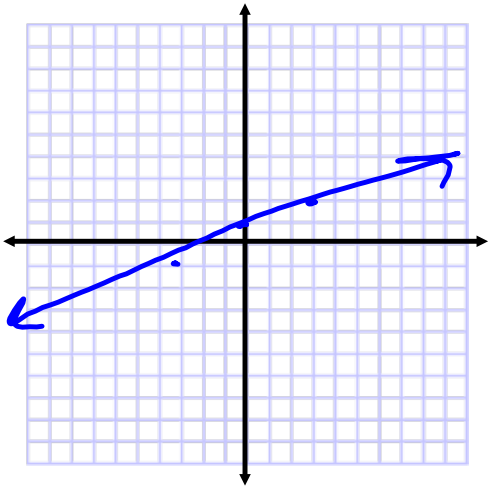
(4,-2)

Calculator Activity: For the following examples, graph in your calculator and draw a sketch

$$y = 3x + 4$$

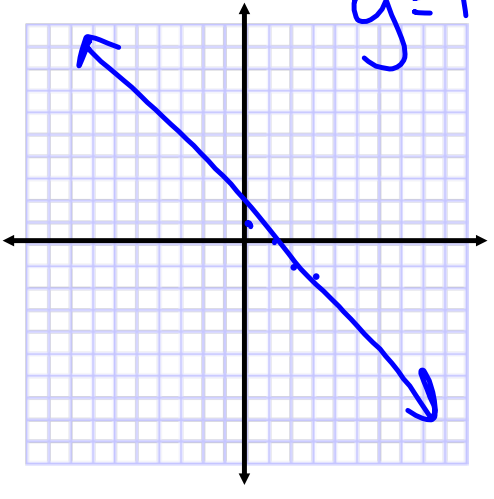


$$y = \frac{2}{3}x + 1$$



$$y + x = 1 - x$$

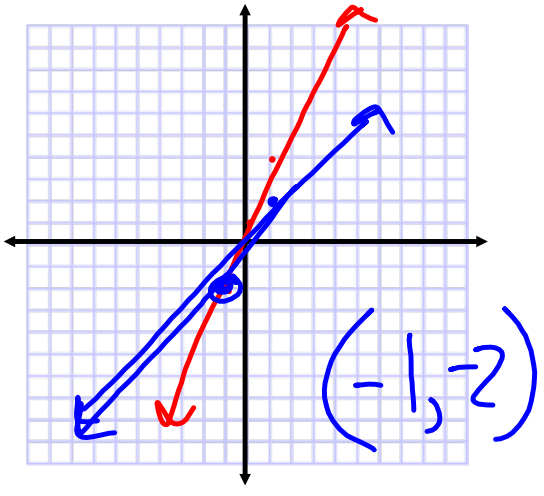
$$-x \qquad y = 1 - x$$



Graph the **system of equations** in the graphing calculator and draw a sketch. Then find the **solution** (intersection)

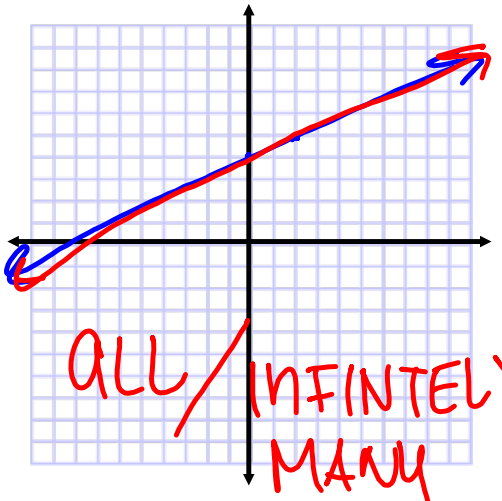
$y = 3x + 1$

$y = 2x$



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

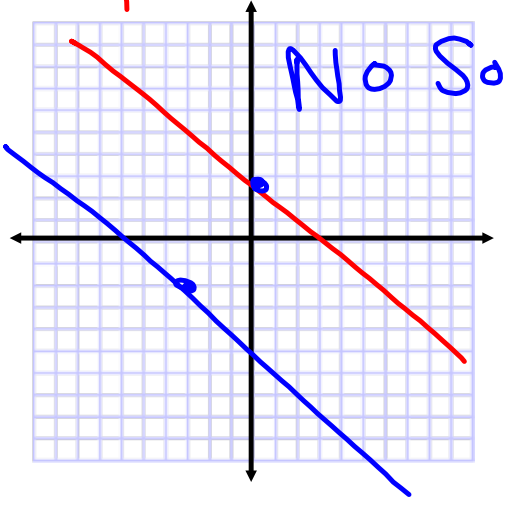
$y = \frac{1}{2}x + 4$



$y - 6 = -x$ $+6$ $y = -x + 6$

$y + x = -2$ $-x$ $y = -2 - x$

-1



Find the solution to each system by graphing:

$$y = x$$
$$y = -2x + 3$$

(1, 1)

$$y = -2x + 4$$
$$y = 4x + 1$$

(½, 3)

Verifying Solutions: Graphically

Determine if the ordered pair is a solution to the system. If not, state the correct solution.

$y = \frac{1}{3}x - 3$

$y = -x + 1$

$(3,-2)$

yes!

$y = -1$

$y = -\frac{5}{2}x + 4$

$(2,-1)$

yes

$y = 3x - 4$

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

$(0,-4)$

(2,2)

No

Verifying Solutions: Algebraically

Substitute in the ordered pair to determine if it's a solution to the system.

$y = 4x + 3$

$y = -x - 2$

$(-1, -1)$

(x, y)

$-1 = 4(-1) + 3$

$-1 = -4 + 3$

$-1 = -1$

yes

$-1 = -(-1) - 2$

$-1 = 1 - 2$

$-1 = -1$

Verifying Solutions: Algebraically

$y = -2x + 2$

$y = -2x - 2$

$(0,2)$

x, y

$2 = -2(0) + 2$

$2 = 0 + 2$

$2 = 2$ ✓

NOT A SOLUTION

$2 = -2(0) - 2$

$2 = 0 - 2$

~~$2 = -2$~~

Verifying Solutions: Algebraically

$y = x$

$y = -x$

$(2,2)$

x, y

NOT a SOLUTION