

6.1 Solving Systems by Graphing

What is a system of linear equations or a linear system?

A system of equations is a set of equations with the same variables.

$$\begin{aligned} x + 2y &= 5 && \text{equation 1} \\ 2x - 3y &= 3 && \text{equation 2} \end{aligned}$$

What is a solution of a linear system?

A solution of a system of linear equations in two variables is an ordered pair (x, y) that satisfies each equation in the system.

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Tell whether the ordered pair is a solution to the linear system.

1. $(-3, 1)$

$$\begin{aligned} x + y &= -2 \\ x + 5y &= 2 \end{aligned}$$

yes

$$\begin{aligned} -3 + 1 &= -2 \\ -2 &= -2 \quad \checkmark \\ -3 + 5(1) &= 2 \\ -3 + 5 &= 2 \quad \checkmark \end{aligned}$$

2. $(-2, 1)$

$$\begin{aligned} 6x + 5y &= -7 \\ x - 2y &= 0 \end{aligned}$$

No

$$\begin{aligned} 6(-2) + 5(1) &= -7 \\ -12 + 5 &= -7 \quad \checkmark \\ -2 - 2(1) &= 0 \\ -2 - 2 &= 0 \quad \checkmark \\ -4 &\neq 0 \quad \times \end{aligned}$$

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Solving a Linear System using Graph-and-Check:

To use the graph-and-check method to solve a system of linear equations in two variables, use the following steps:

- Write equation in a form easy to graph. ($y = mx + b$)
- Graph both equations in the same coordinate plane.
- Estimate the coordinates of the point of intersection.
- Check the coordinates algebraically by substituting into each equation of the original linear system.

Ex.1 $y = 3x - 2$
 $y - x = 2$
 $+x \quad +x$
 $y = x + 2$

$4 = 3(2) - 2$
 $4 = 6 - 2 \quad \checkmark$
 $4 - 2 = 2 \quad \checkmark$

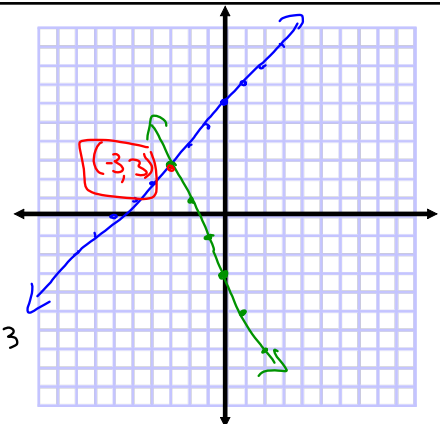
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Example 2:

$$\begin{aligned} y &= x + 6 \\ y &= -2x - 3 \end{aligned}$$

check

$$\begin{aligned} 3 &= -3 + 6 \\ 3 &= 3 \quad \checkmark \\ 3 &= 2(-3) - 3 \\ 3 &= 6 - 3 \quad \checkmark \end{aligned}$$



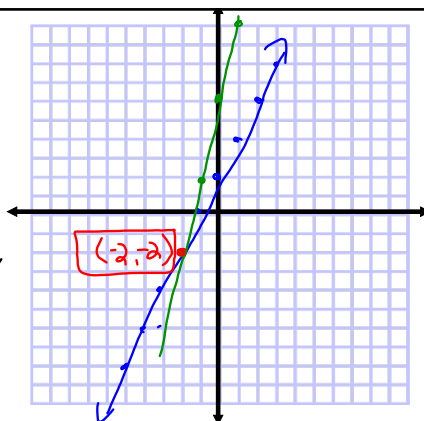
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Example 3:

$$\begin{aligned} y &= 2x + 2 \\ y &= 4x + 6 \end{aligned}$$

check

$$\begin{aligned} -2 &= 2(-2) + 2 \\ -2 &= -4 + 2 \quad \checkmark \\ -2 &= 4(-2) + 6 \\ -2 &= -8 + 6 \quad \checkmark \end{aligned}$$



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Example 4:

$$\begin{aligned} 2x + y &= 0 \\ -2x - y &= -4 \end{aligned}$$

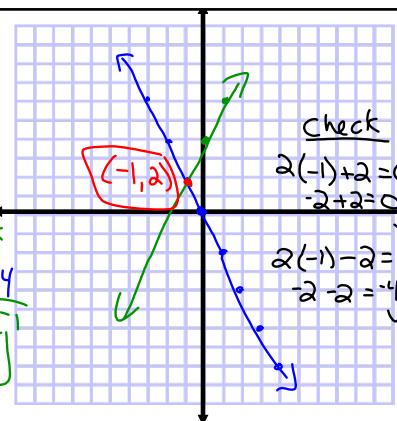
$y = -2x$

$$\begin{aligned} 2x - y &= -4 \\ -2x - y &= -4 \end{aligned}$$

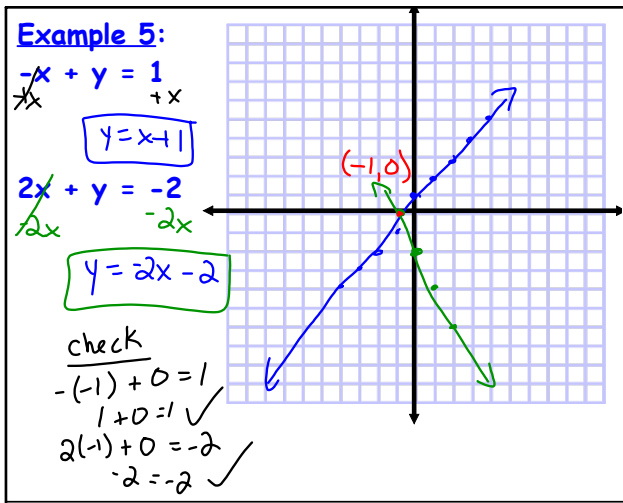
$-y = -2x - 4$
 $y = 2x + 4$

check

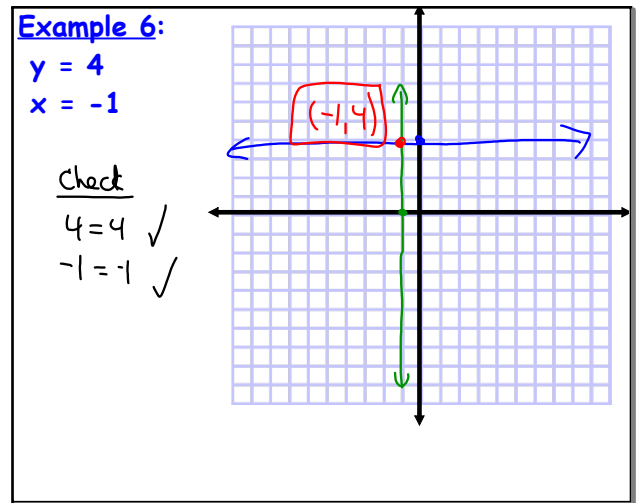
$$\begin{aligned} 2(-1) + 2 &= 0 \\ -2 + 2 &= 0 \quad \checkmark \\ 2(-1) - 2 &= -4 \\ -2 - 2 &= -4 \quad \checkmark \end{aligned}$$



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Classwork: p.372 #4 - 22 even

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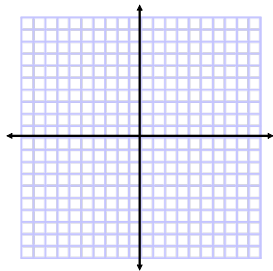
#12 - 22 graph on back of notes

Final Five

Solve by graphing.

$$y = x - 4$$

$$y = -x$$



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