

# Algebra I

## 2.2.D.9: Graph and solve systems of linear equations.

### VOCABULARY

A **system of linear equations**, or simply a *linear system*, consists of two or more linear equations in the same variables. An example is shown below.

$$x + 2y = 7 \quad \text{Equation 1}$$

$$3x - 2y = 5 \quad \text{Equation 2}$$

A **solution of a system of linear equations** in two variables is an ordered pair that satisfies each equation in the system.

Example 1: Which of the ordered pairs is a solution of the linear system:

$$x + 2y = 7$$

$$3x - 2y = 5$$

~~a) (1, 3)~~      ~~b) (0, -2.5)~~      **c. (3, 2)**

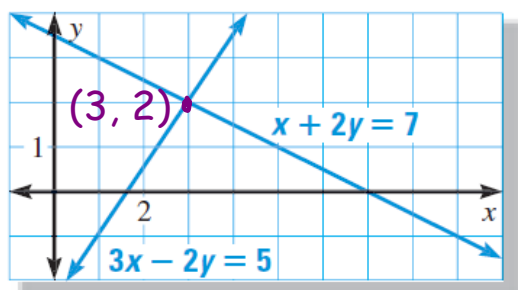
~~$1 + 2(3) = 7$   
 $1 + 6 = 7 \checkmark$   
 $3(1) - 2(3) = 5$   
 $3 - 6 = 5 \times$~~

~~$0 + 2(-2.5) = 7$   
 $-5 = 7 \times$~~

$3 + 2(2) = 7$   
 $3 + 4 = 7 \checkmark$   
 $3(3) - 2(2) = 5$   
 $9 - 4 = 5 \checkmark$

One way to find the **solution** of a system of equations is by **GRAPHING**. The point where two lines cross is the **SOLUTION** of the system.

The graph below shows the intersection of the lines given in Example 1.

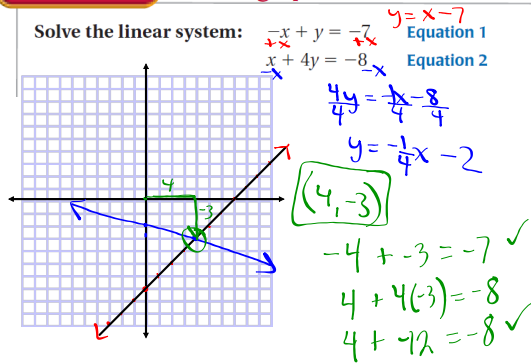


**TYPES OF LINEAR SYSTEMS** In Example 1, the linear system has exactly one solution. A linear system that has exactly one solution is called a **consistent independent system**

### Solving a Linear System Using the Graph-and-Check Method

**Note:**  
You must be accurate at plotting your points and lining them up with a STRAIGHT EDGE!!!

#### EXAMPLE 2 Use the graph-and-check method



#### GUIDED PRACTICE for Examples 1 and 2

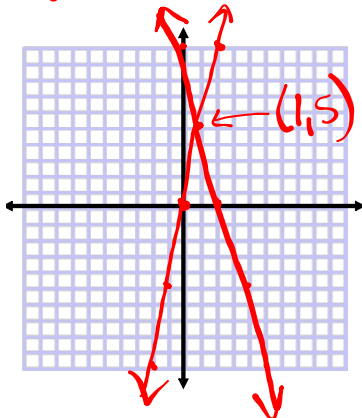
Solve the linear system by graphing. Check your solution.

1.  $-5x + y = 0$   $(1, 5)$   
 $5x + y = 10$

Handwritten work:

$$y = 5x + 0$$

$$y = -5x + 10$$



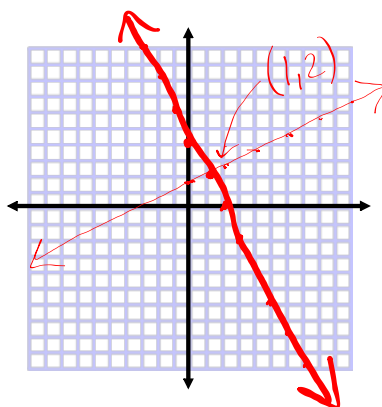
2.  $-x + 2y = 3$   $(1, 2)$   
 $2x + y = 4$

Handwritten work:

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

$$y = \frac{1}{2}x + 1.5$$

$$y = -2x + 4$$



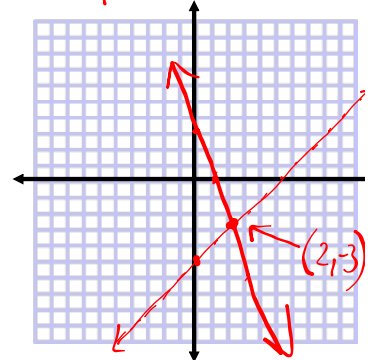
3.  $x - y = 5$   $(2, -3)$   
 $3x + y = 3$

Handwritten work:

$$\frac{-y}{-1} = \frac{-x+5}{-1}$$

$$y = x - 5$$

$$y = -3x + 3$$



# Homework:

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