Inspiring Greatness

INDEPENDENCE SCHOOL DISTRICT

Math Virtual Learning

Grade 8

Solving Linear Systems: Graphing

May 20, 2020

Math 8

Lesson: May 20, 2020

Objective/Learning Target:

I can solve linear systems by graphing.

Warm-Up:

Can you solve this puzzle?

Answer below

= 21 Units

= 15 Units

What is the weight of each?

 = _____  = _____

Solution: apple = 1.5 units basket = 6 units

Review: Equation in Slope-Intercept Form

$$y = mx + b$$

slope — y-intercept

Example:

$$y = 2x + 3$$

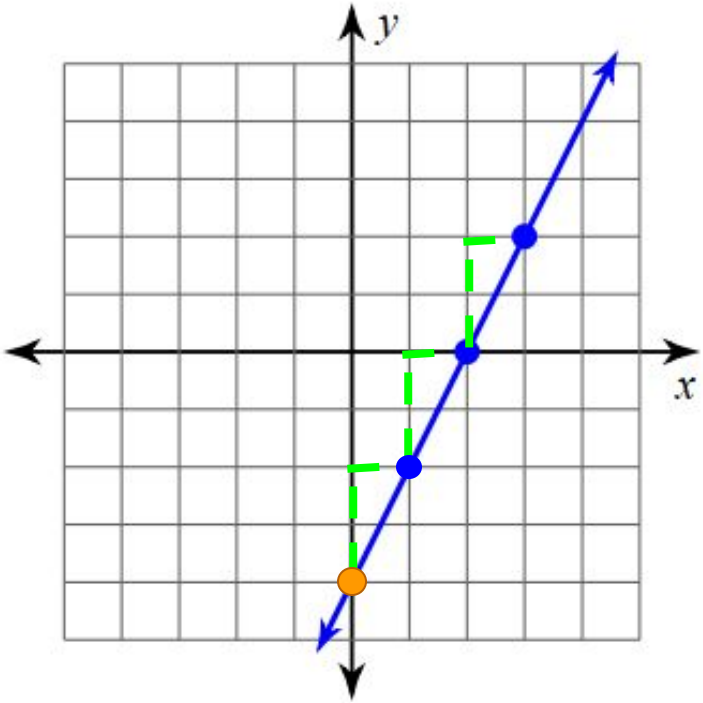
slope — y-intercept

2/1 is the slope

(0,3) is the y-intercept

Review: Graph an Equation

Graph: $y = 2x - 4$



① **Plot the y-intercept.**

The y-intercept is at (0,–4).

② **Count the slope and make more points.**

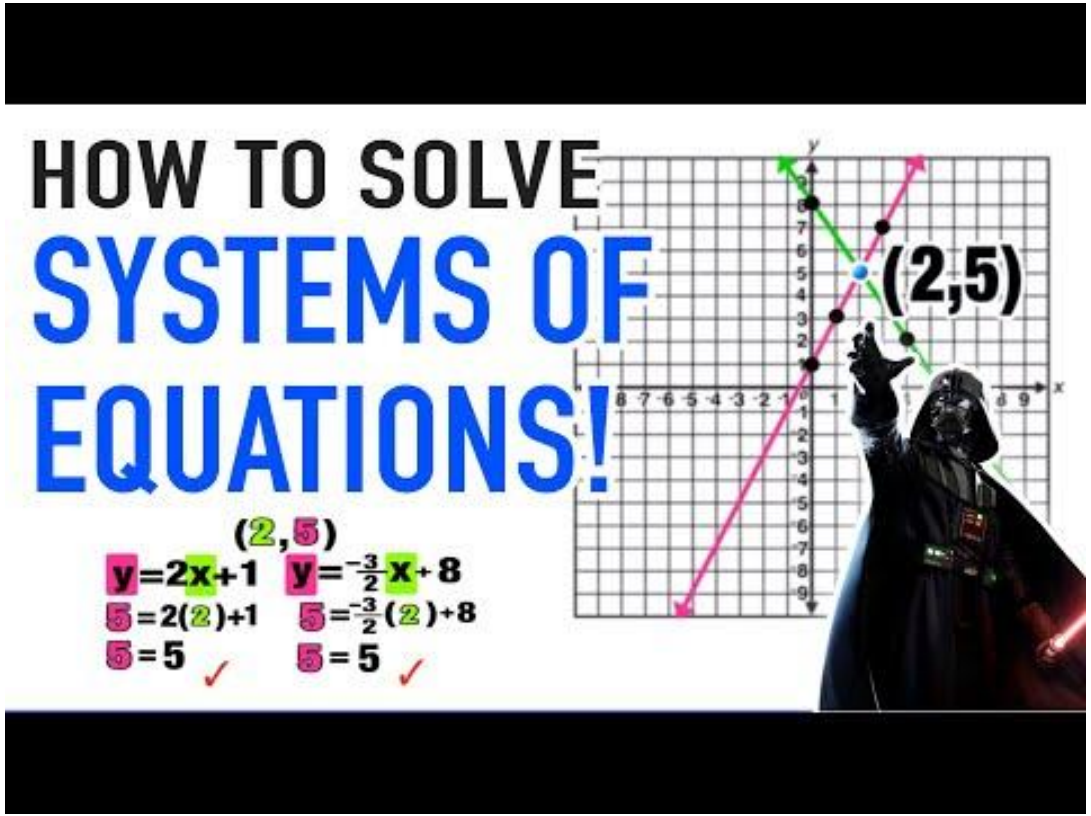
The slope is 2 or 2/1, so we will count "up 2, right 1" each time we make a new point.

③ **Draw a line (arrows on both ends) through your points.**

You can check that your graph is correct by plugging in *any* point on the line into the equation. For example, we can plug in the point (1, –2) using x=1 and y=–2.
So: (–2) = 2(1) – 4, and when we solve –2 = –2

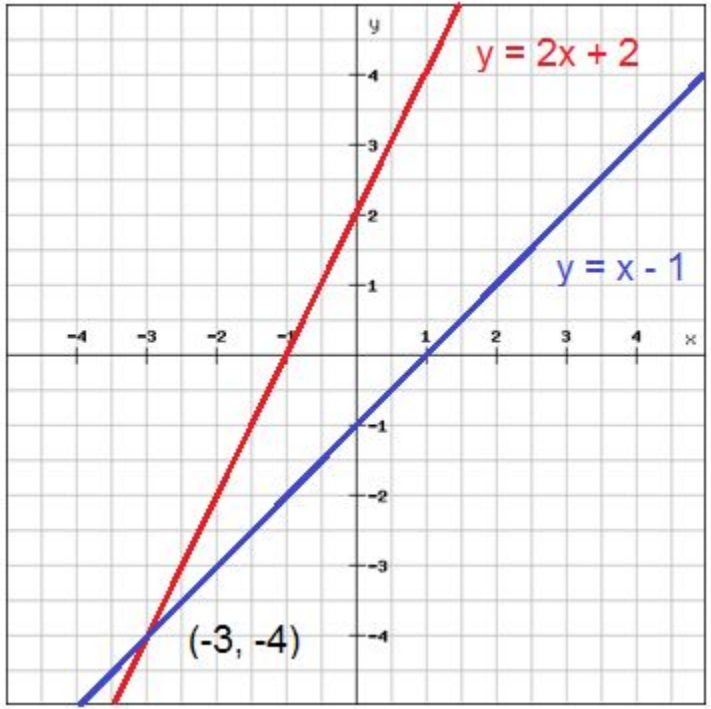
Video:

Take notes on a piece of paper as you watch this video.



How To: Graph a System of Equations

Graph: $y = 2x + 2$
$y = x - 1$

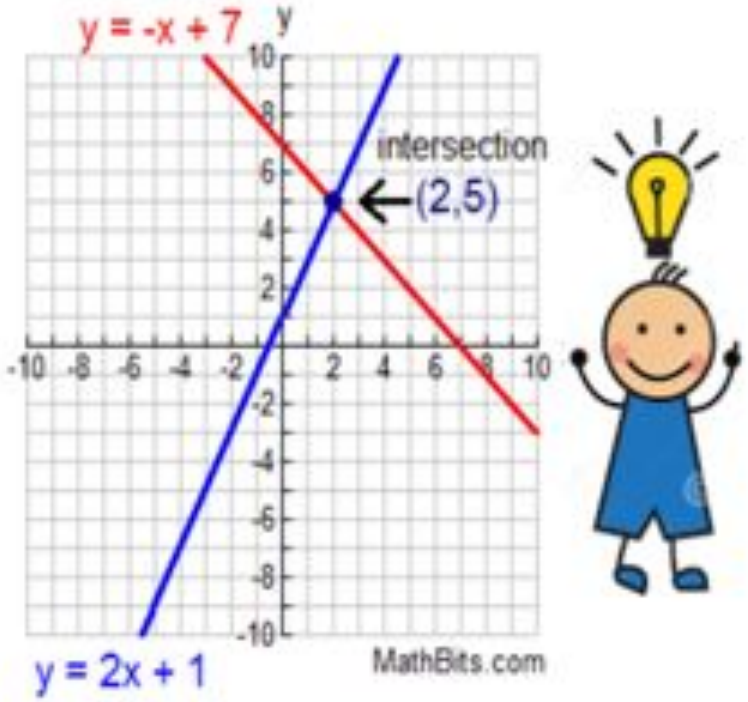


① **Graph the first equation.**
The y-intercept is at (0,2). The slope is 2 or 2/1, so we will count "up 2, right 1" each time we make a new point.
The line is shown in red.

② **Graph the second equation.**
The y-intercept is at (0,–1). The slope is 1 or 1/1, so we will count "up 1, right 1" each time we make a new point.
The line is shown in blue.

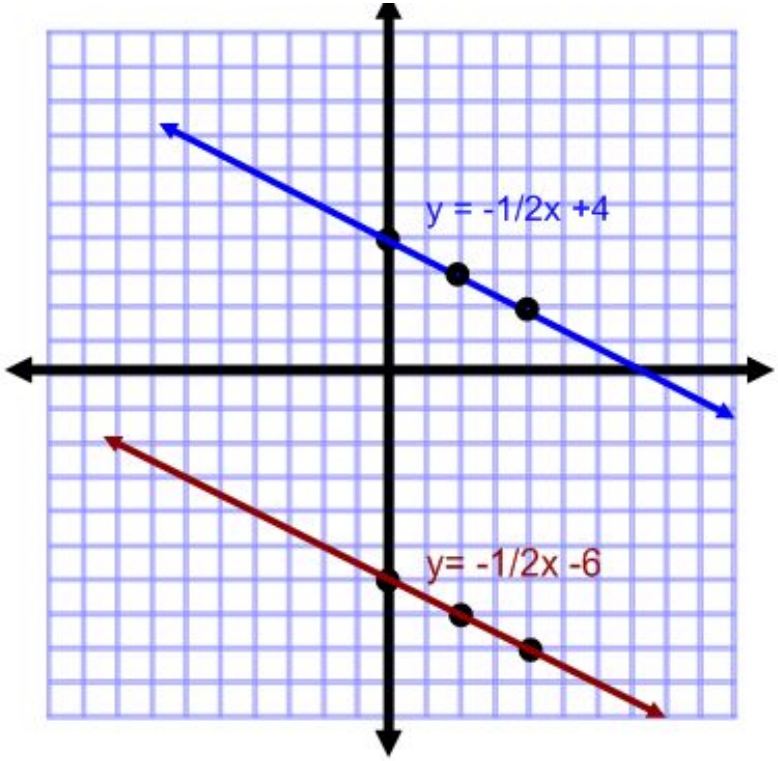
③ **Identify the point(s) of intersection as the solution to the system of equations.**
These lines intersect at (–3,–4).

Example 1: System with One Solution *(crosses at one point)*



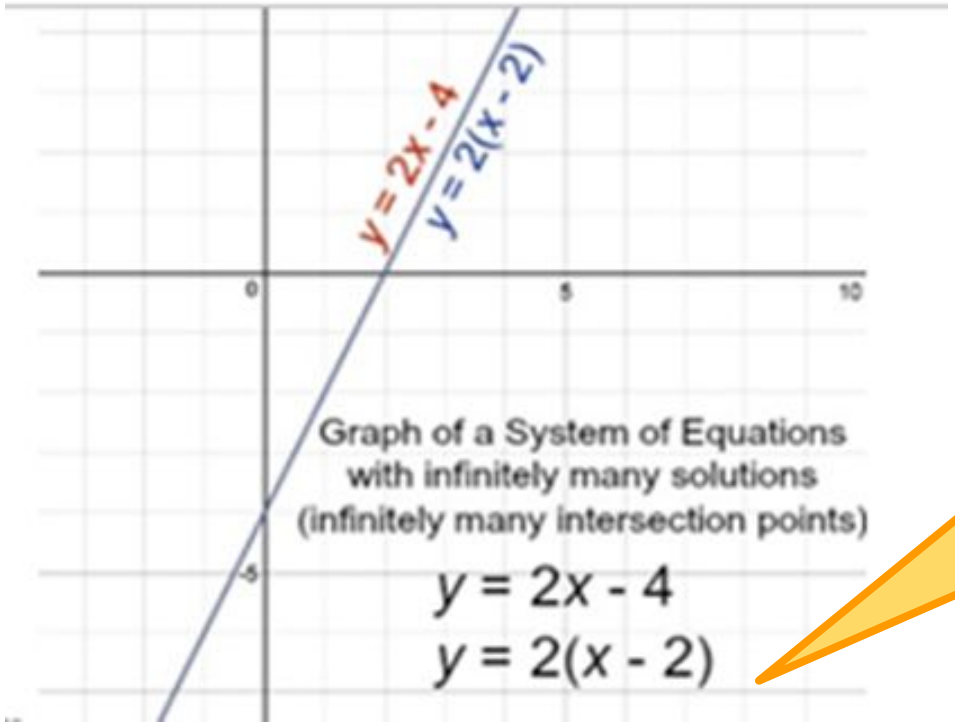
Example 2: System with No Solution

(same slope but different y-intercepts)



Example 3: System with Infinite Solutions

(same slope and same y-intercept)



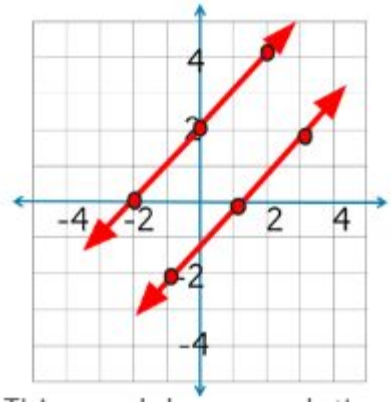
Notice the second equation is not in slope-intercept form.

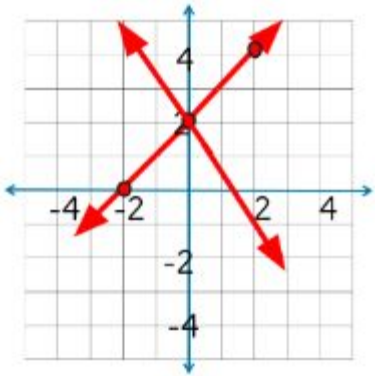
(You would need to *distribute* first before graphing.)

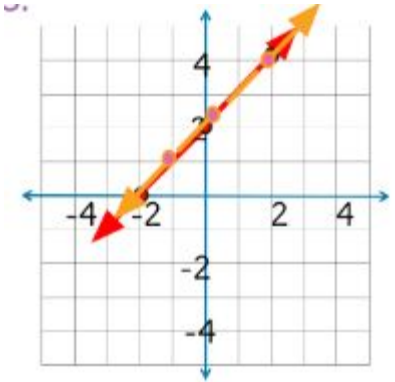
Practice 1:

Answers on next slide

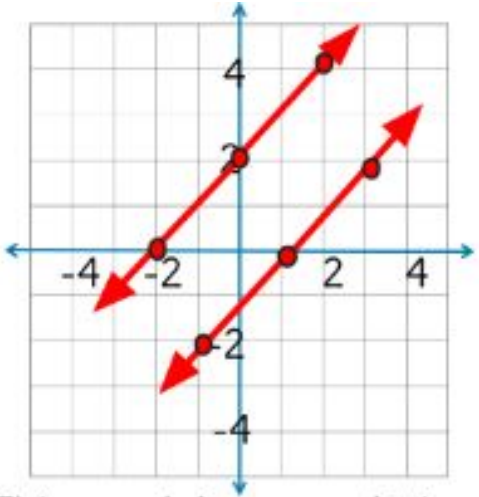
Label each graph as one solution (state the point of intersection), no solution, or infinite solutions.



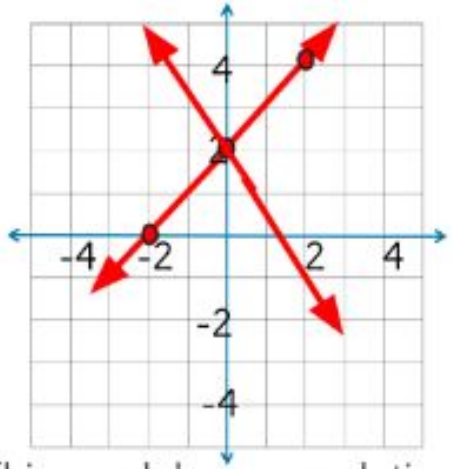




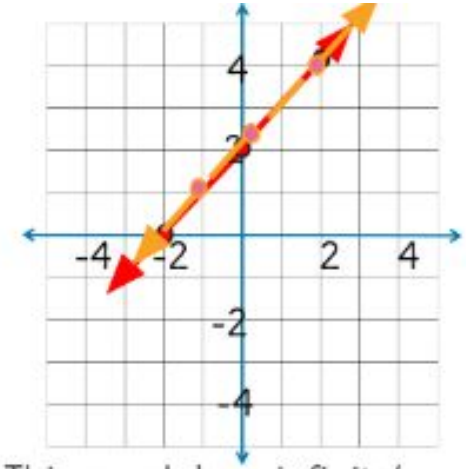
Practice 1: Answer Key



This graph has *no* solution. The two lines are parallel (have the same slope and different y-intercepts) and will never share any points.



This graph has *one* solution. The two lines share the point (0,2) because they have different slopes and y-intercepts.



This graph has *infinitely many* solutions. The two lines share every point infinitely because they have the same slope and y-intercept.

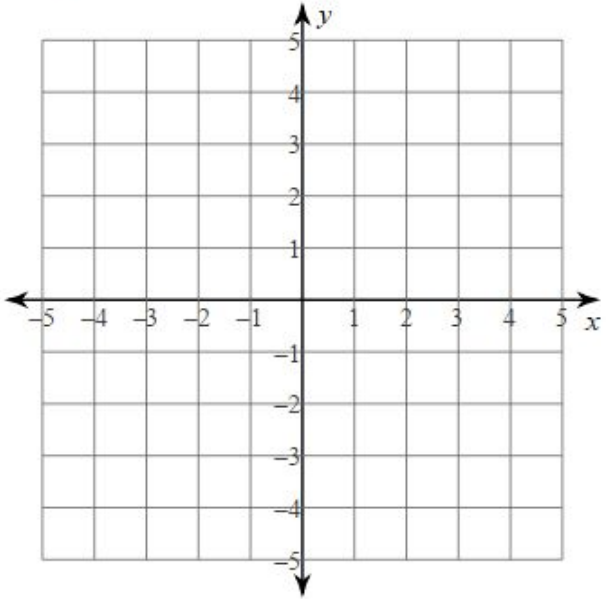
Practice 2:

Answers on next slide

Graph and find the solution(s) to each of the systems.

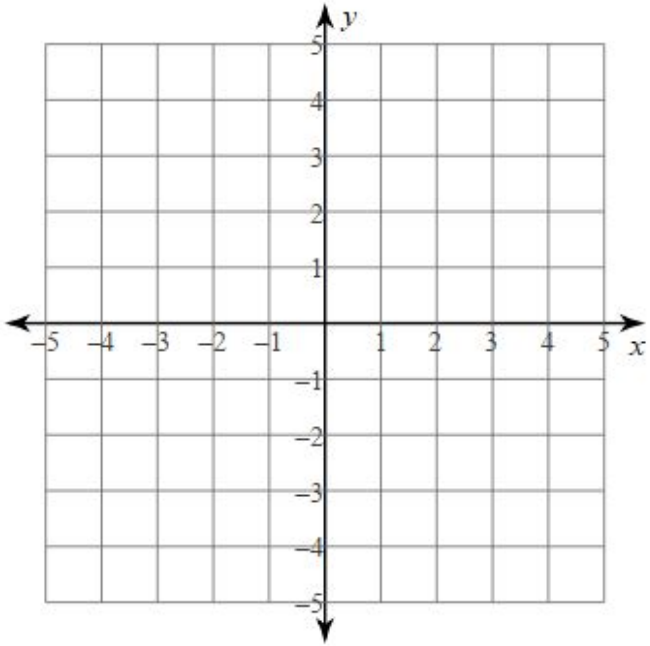
1) $y = \frac{1}{2}x - 1$

$y = 3x + 4$



2) $y = 4$

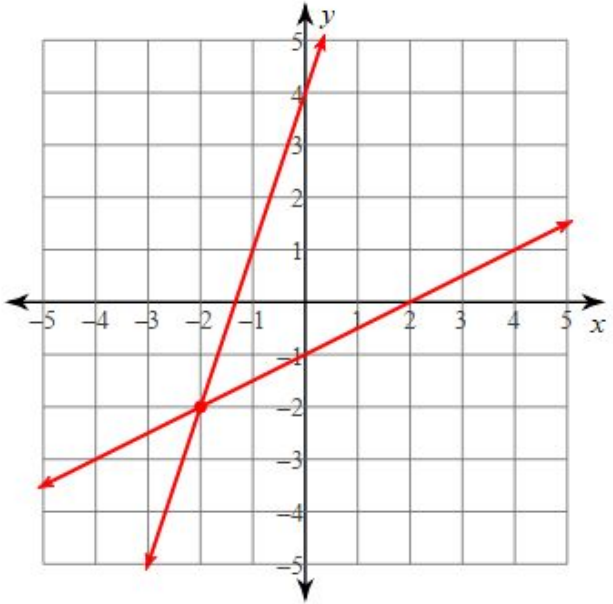
$y = -x + 2$



Practice 2: *Answer Key*

1) $y = \frac{1}{2}x - 1$

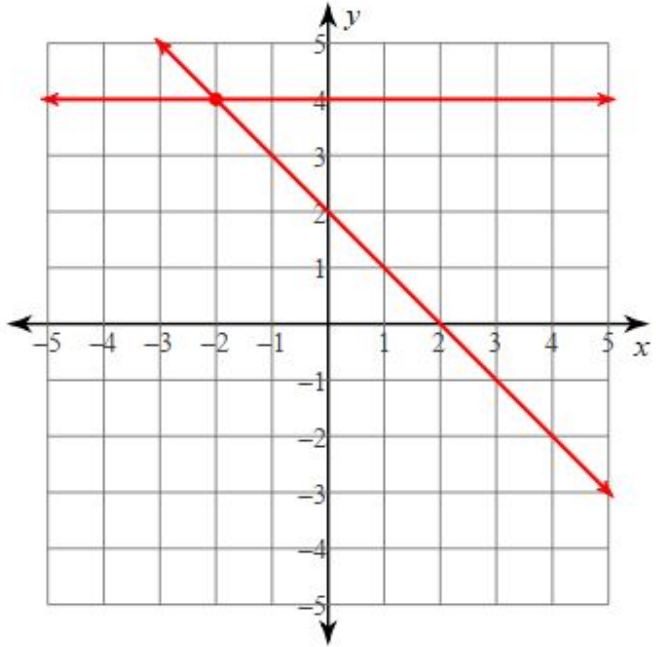
$y = 3x + 4$



$(-2, -2)$

2) $y = 4$

$y = -x + 2$



$(-2, 4)$

Additional Resources:

Solve a System of Equations with Graphing - IXL

Solving Systems of Equations with Graphing - Quia

Printable graph paper

Virtual graph paper