Edgenuity®

Warm-Up | Using Graphs to Solve Systems

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Lesson Question

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Lesson Goals

| **Rewrite** linear equations in ⬚-intercept form. | → | **Graph** both linear equations on a coordinate plane. | → | **Determine** the ⬚ of a linear system from a graph. |

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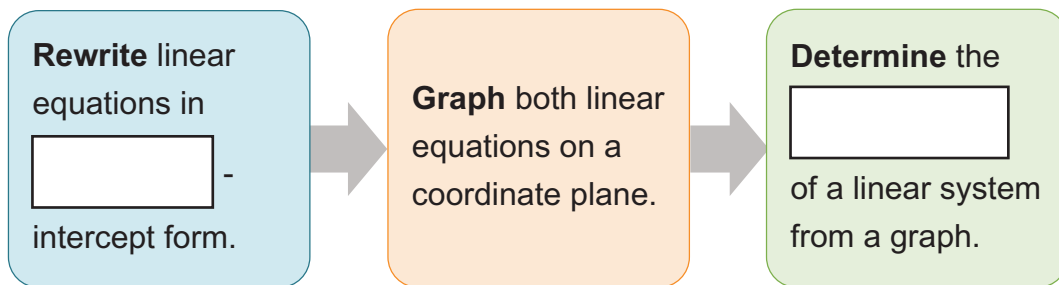
Words to Know

Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.

_____ slope-intercept form

_____ system of equations

_____ graph

_____ substitute

_____ solution to a system of equations

A. to take the place of; to replace

B. a visual representation of data

C. the form of a linear relation that is written as is $y = mx + b$, where m and b are real numbers, m is the slope and b is the y-intercept of the line

D. the point or points that make all equations in a system true

E. two or more equations that have common variables

Solving a System of Equations Using a Graph

Graph the **system of equations** to determine the **solution to the system of equations.**

$y = x + 2$
$y = 5x - 6$

Graph and label the intersection point of the two lines.

Both equations are already in slope-intercept form.

Graph $y = x + 2$:

Slope = [   ] , y-intercept = 2

Graph $y = 5x - 6$:

Slope = [   ] , y-intercept = −6

Checking the Solution

To check a solution for a system:

- **Substitute** (x, y) into each equation.

- Simplify.

- Check for ☐ statements.

Verify whether $(-2, 2)$ is the solution to this system of equations:

$$y = -x$$
$$y = 2x + 6$$

Substitute $(-2, 2)$ into $y = -x$.

$$\boxed{} = -(-2)$$
$$2 = 2 \qquad \text{True}$$

Substitute $(-2, 2)$ into $y = 2x + 6$.

$$2 = 2(\boxed{}) + 6$$

$$2 = \boxed{} + 6$$
$$2 = 2 \qquad \text{True}$$

So $(-2, 2)$ is a solution for the system.
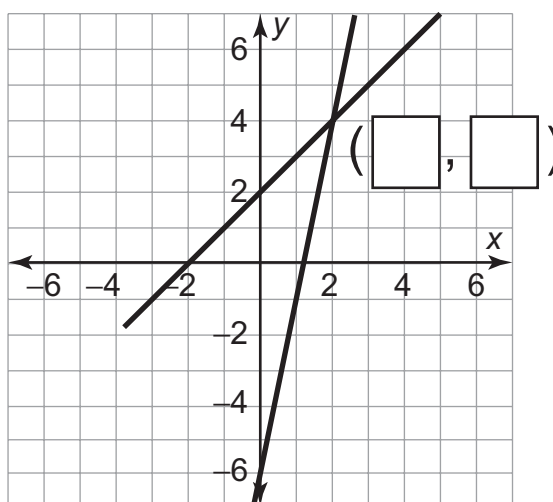
Instruction | Using Graphs to Solve Systems

Rewriting Equations in Slope-Intercept Form

Solve the system of equations graphically.

$$3x + y = 1$$
$$2(x + 2y) = -16$$

- [ ] each equation to **slope-intercept form**: $y = mx + b$

$$3x + y = 1$$
$$\underline{-3x \qquad\qquad - 3x}$$
$$y = \boxed{}$$

$$2(x + 2y) = -16$$
$$\boxed{} + 4y = -16$$
$$\underline{- 2x \qquad\qquad - 2x}$$
$$4y = -2x - 16$$

$$\frac{4y}{4} = \frac{-2x - 16}{4}$$

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

$$y = \boxed{}$$

Graphing a System of Equations

Graph the system of equations.

$y = 3x + 1$ $y = \dfrac{-1}{2}x - 4$

- Graph both lines using the *y*-intercept and the

  [   ].

- Locate the

  [   ]

  (if one exists).

Graph and label the intersection point of the two lines.

$(\boxed{}, \boxed{})$

- State the solution of the

  system. ($\boxed{}$, –5)
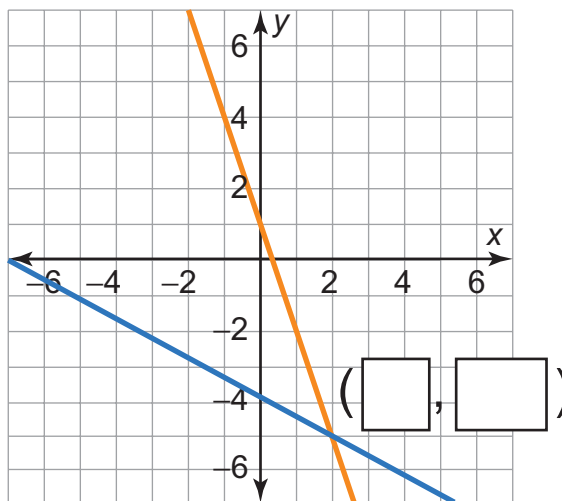
Verify that the solution is (2, –5).

$3x + y = 1$

$3(\boxed{}) + (-5) = 1$

$6 + (-5) = 1$

$\boxed{} = 1$

True

$2(x + 2y) = -16$

$2(2 + 2(-5)) = -16$

$2(2 + (-10)) = -16$

$2(-8) = -16$

$\boxed{} = -16$

True

Because we have two true statements, this verifies that the solution is (2, –5).

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Finding a Solution Using a Graph

EXAMPLE

Find the solution to this system of equations by graphing both lines.

$$6x + 3y = 9$$

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

Rewrite both equations in slope-intercept form.

$$x + \frac{1}{2}y = -2$$
$$\underline{-x \qquad \quad -x}$$
$$\frac{1}{2}y = -x - 2$$

$$2\left(\frac{1}{2}y\right) = (-x - 2)\boxed{}$$

$$y = \boxed{} - 4$$

$$6x + 3y = 9$$
$$\underline{-6x \qquad \quad -6x}$$
$$3y = -6x + 9$$

$$\frac{3y}{\boxed{}} = \frac{-6x + 9}{3}$$

$$y = \boxed{} + 3$$

Both equations have the same slope, –2, but they have different

$\boxed{}$ -intercepts.

We now can determine that this is a system with no solution, because the

lines are $\boxed{}$.

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<table>
<tr><td>**Lesson Question**</td><td>How do you use graphs to solve a system of two linear equations?</td></tr>
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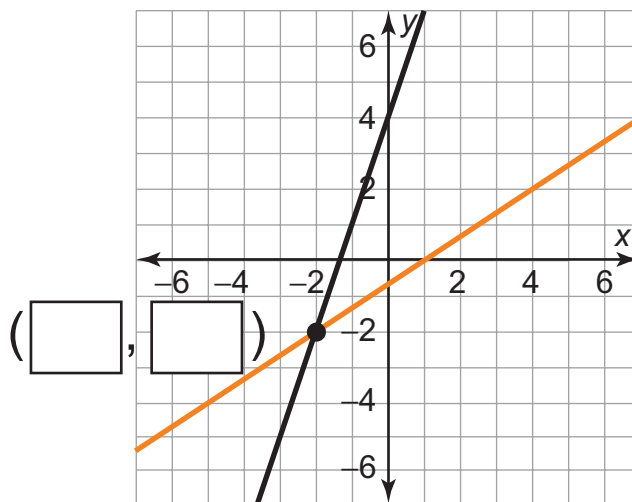✔

Answer

2

Review: Key Concepts

- System in standard form:

$$-2x + 3y = -2$$
$$6x - 2y = -8$$

- System converted to slope–intercept form:

$$y = \frac{2}{3}x - \frac{2}{3}$$
$$y = 3x + 4$$

$\left(\boxed{}, \boxed{} \right)$
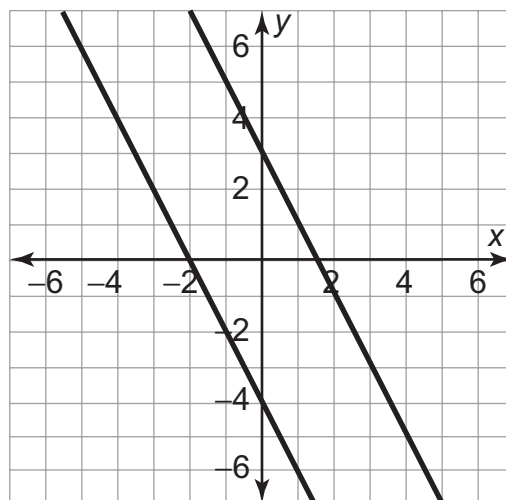
Summary | Using Graphs to Solve Systems

Use this space to write any questions or thoughts about this lesson.