solution to a system E. two or more equations that have common of equations variables

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

substitute

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

graph

B. a visual representation of data

system of equations

**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 A. to take the place of; to replace

**Warm-Up** Using Graphs to Solve Systems



**?**

**W**

**2K**

**Lesson Question**

of a linear system

from a graph.

**Graph** both linear equations on a

coordinate plane.

**Determine** the

**Rewrite** linear equations in

-

intercept form.

**Lesson Goals**

**Slide**

## 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

**2**



*y* = 5*x* − 6

Both equations are already in slope- intercept form.

Graph *y* = *x* + 2:

Slope = , *y*-intercept = 2

Graph *y* = 5*x* − 6:

Slope = , *y*-intercept = −6

*Graph and label the intersection point of the two lines.*

6

*y*

# ( , )

4

2

−2

4

2

2



4



6



*x*

6

−4

−6

**Slide**

## 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* = 2*x* + 6

Substitute (−2, 2) into *y* = −*x*.

**5**

= −(−2)

2 = 2 True

So (−2, 2) is a solution for the system.

Substitute (−2, 2) into *y* = 2*x* + 6.

2 = 2( ) + 6

2 = + 6

2 = 2 True

**Slide**

## Rewriting Equations in Slope-Intercept Form

Solve the system of equations graphically.

3*x* + *y* = 1 2(*x* + 2*y*) = −16

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

3*x*  *y*

3*x*

 1

 3*x*

2(*x* 

2 *y*)

* 4 *y*

  16

  16

*y*   2*x*

* 2*x*

4 *y*   2*x*  16

4 *y*  2*x*  16

4 4

2

*y*   4 *x*  4

**8**

*y* 

**Slide**



, −5)

system. (

* State the solution of the

)

,

(

4

6

(if one exists).

2

4 6

2

6 4 2

* Locate the

*x*

6

4

2

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

.

•

*y*

2

*Graph and label the intersection point of the two lines.*

*y*  1 *x*  4

*y* = 3*x* + 1

**Graphing a System of Equations**

Graph the system of equations.

**10**

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

True

True

= 1 = −16

2(2 + 2(−5)) = −16

2(2 + (−10)) = −16

2(−8) = −16

) + (−5) = 1

6 + (−5) = 1

3(

Verify that the solution is (2, −5).

2(*x* + 2*y*) = −16

3*x* + *y* = 1

**Slide**

## Finding a Solution Using a Graph

**EXAMPLE**

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

6*x* + 3*y* = 9

1

*x*  2 *y*  2

Rewrite both equations in slope-intercept form.

*x*  1 *y*

2

 2

6*x* 

6*x*

3 *y* 

9

* 6 *x*

 *x*

1 *y*

2

* + *x*

  *x*  2

3 *y*

3*y*

  6*x*  9

 6*x*  9

 1 2 2



*y*  (*x*  2)

3

*y* = + 3



*y*   4

**12**



Both equations have the same

*y*

slope, −2, but they have different 6

-intercepts.

4

We now can determine that this is 2

a system with no solution, because the lines are .

−4

−6

−2

6

4

2

2



4



6



*x*

**?**

**2**

How do you use graphs to solve a system of two linear equations?

**Lesson Question**



2

4

6

( , )

6

4

2

6 4 2

2 2

*y*  3 *x*  3

*y* = 3*x* + 4

*x*

6 *y*

4

2

System in standard form:

−2*x* + 3*y* = −2 6*x* − 2*y* = −8

System converted to slope–intercept form:

•

•

**Review: Key Concepts**

**Answer**

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