Name Key Period _____

Lesson 6.1 Notes (Graphing Systems of Equations)

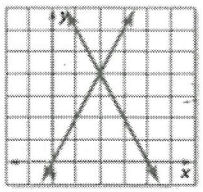
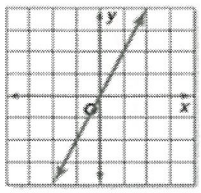
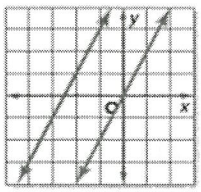
Objectives:

- Determine the number of solutions a system of linear equations has, if any.
- Solve systems of linear equations by graphing.

System of Equations - two or more linear equations involving the same variables

- **Solution** - an ordered pair of numbers that satisfies *both* equations
  - **Consistent** – at least one solution
    - **Independent** – one solution (*intersecting lines*)
    - **Dependent** – infinite solutions (*overlapping lines*)
  - **Inconsistent** – no solution (*parallel lines that never intersect*)

ConceptSummary Possible Solutions

Number of Solutions	exactly one	infinite	no solution
Terminology	consistent and independent	consistent and dependent	inconsistent
Graph			

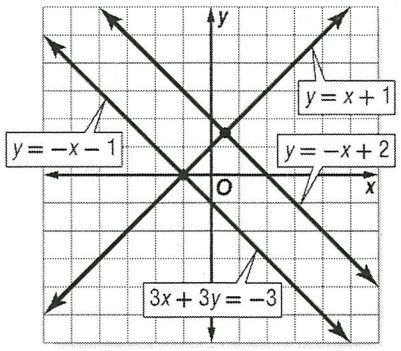
Example 1: Use the graph at the right to determine the solutions of each system of equations.

a. $y = -x + 2$
$y = x + 1$ 1 soln (Consistent + Independent)

$3x+3y=-3$
$y=-x-1$

b. $y = -x + 2$
$3x + 3y = -3$ No soln (Inconsistent)

c. $3x + 3y = -3$
$y = -x - 1$ Infinite (Consistent + Dependent)

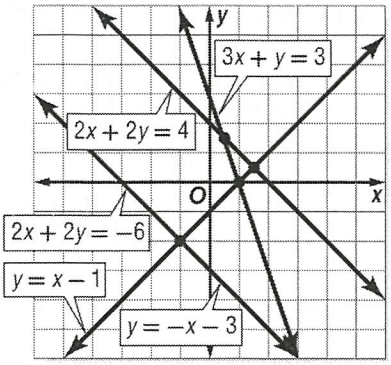


Practice: Use the graph at the right to determine the solutions of each system of equations.

1. $y = -x - 3$
$y = x - 1$ 1 soln (consistent + independent)

$y=-x-3$

2. $2x + 2y = -6$
$y = -x - 3$ Infinite (consistent + dependent)



Name _____ Period _____

Solve by Graphing

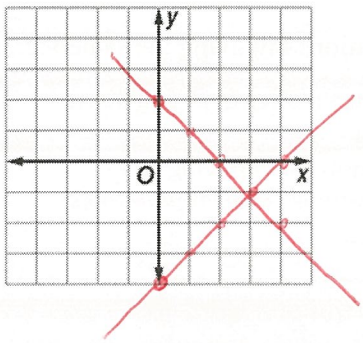
- Graph the equations on the *same* coordinate plane.
- **Solution of the System = the point of intersection**

Example 2: Graph each system and determine the number of solutions that it has. If it has one solution, name it.

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

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

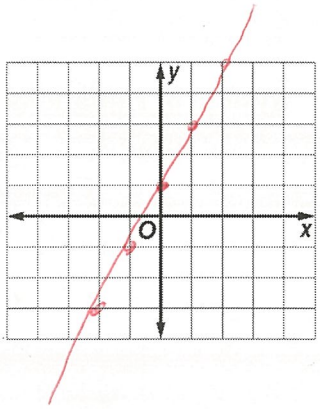
$(3, -1)$



b. $y = 2x + 1$
$2y = 4x + 2$

$y = 2x + 1$

Infinite

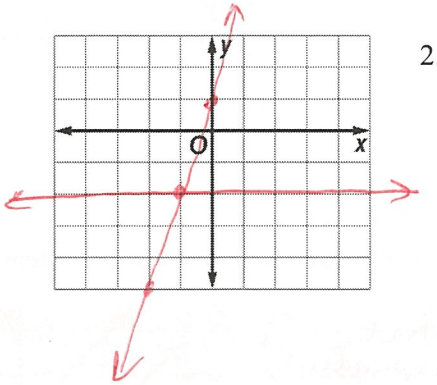


Practice: Graph each system and determine the number of solutions it has. If it has one solution, name it.

1. $y = -2$
$3x - y = -1$

$y = 3x + 1$

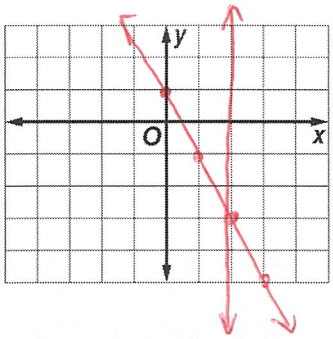
$(-1, -2)$



2. $x = 2$
$2x + y = 1$

$y = -2x + 1$

$(2, -3)$



Real-world Application

Example 3: Nicole rode 20 miles last week and plans to ride 35 miles per week. Diego rode 50 miles last week and plans to ride 25 miles per week. Predict the week in which Nicole and Diego will have ridden the same number of miles.

x = # of weeks
y = # of miles

Nicole: $y = 35x + 20$

Diego: $y = 25x + 50$

Week 3 (125 miles)