Algebra I
Lesson 7-1

- I can determine whether a system of linear equations has 0, 1, or infinitely many solutions.
- I can solve systems of equations by graphing.

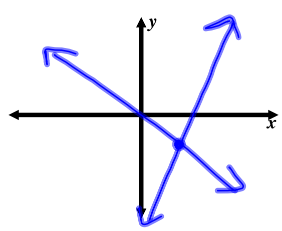
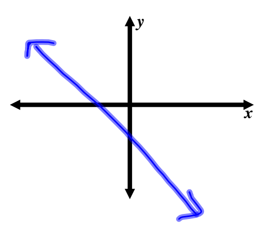
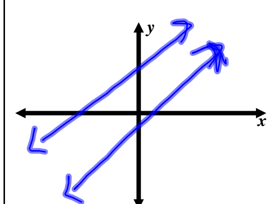
A set of equations with the same variables is called a __system of equations__. A solution to such a system is an __ordered pair__ of numbers that satisfies __both__ equations. A system of two linear equations can have __0__, __1__, or __an infinite number__ of solutions.

If the graphs intersect or coincide, the system of equations is said to be consistent. It has at least one ordered pair that satisfies both equations.

If the graphs are parallel, the system of equations is said to be inconsistent. There are no ordered pairs that satisfy both equations.

Consistent equations can be independent or dependent. If a system has exactly one solution, it is independent. If the system has an infinite number of solutions, it is dependent.

Systems of Equations

	Intersecting Lines	Same Line	Parallel Lines
Graph			
Number of Solutions	exactly one	infinitely many	no solution
Terminology	Consistent & Independent	Consistent & Dependent	Inconsistent

Use the graph to determine whether each system has *no* solution, *one* solution, or *infinitely many* solutions.

$y = -x + 5$
$y = x - 3$

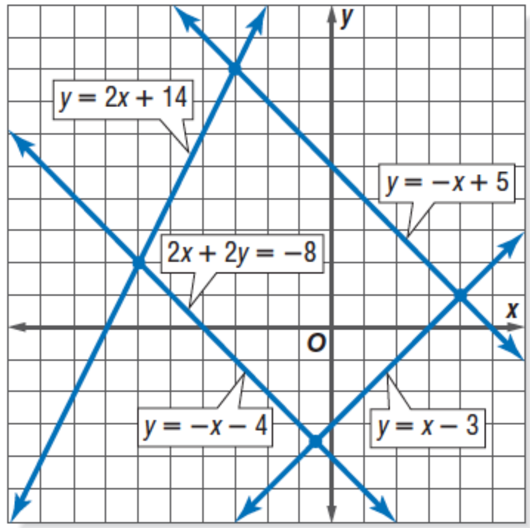
intersect
one solution

$y = -x + 5$
$2x + 2y = -8$

parallel
no solution

$2x + 2y = -8$
$y = -x - 4$

coincide
infinite number of solutions



Graph each system of equations. Then determine whether the system has *no* solution, *one* solution, or *infinitely many* solutions. If the system has one solution, name it.

$y = -x + 8$
$y = 4x - 7$

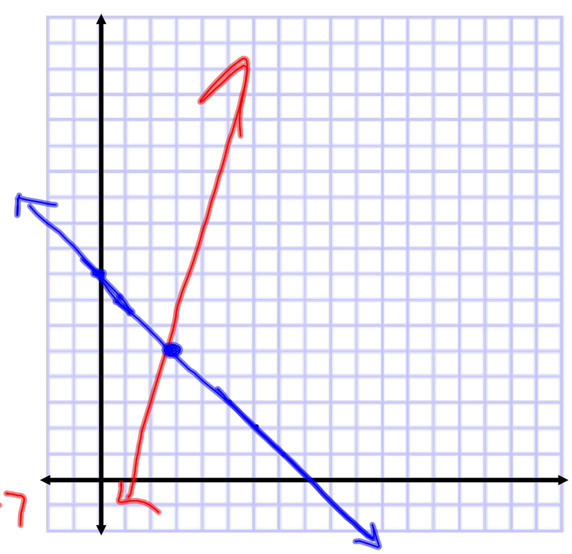
$y = -x + 8$
$m = -1$
$b = 8$

$y = 4x - 7$
$m = 4$
$b = -7$

(3,5)

(3,5)
$5 = -3 + 8$
$5 = 5$
T

$5 = 4(3) - 7$
$5 = 12 - 7$
$5 = 5$
T

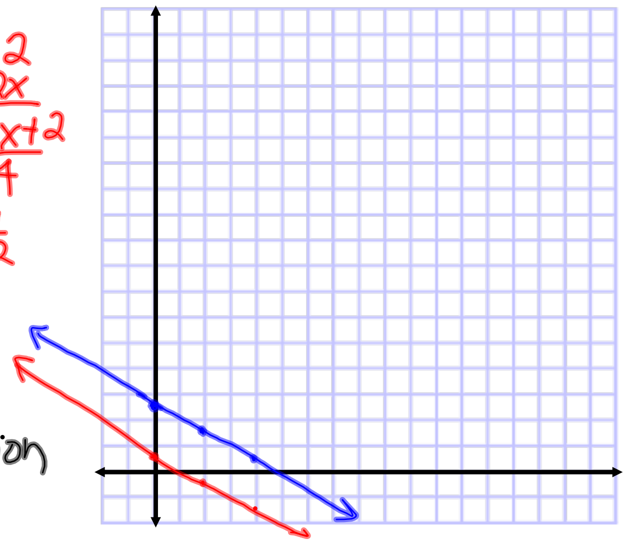


$x + 2y = 5$
$2x + 4y = 2$

$x + 2y = 5$
$-x \quad -x$
$\frac{2y}{2} = \frac{-x + 5}{2}$
$y = -\frac{1}{2}x + \frac{5}{2}$
$m = -\frac{1}{2} \quad b = \frac{5}{2}$

$2x + 4y = 2$
$-2x \quad -2x$
$\frac{4y}{4} = \frac{-2x + 2}{4}$
$y = \frac{-1}{2}x + \frac{1}{2}$
$m = \frac{-1}{2}$
$b = \frac{1}{2}$

no solution
(parallel lines)

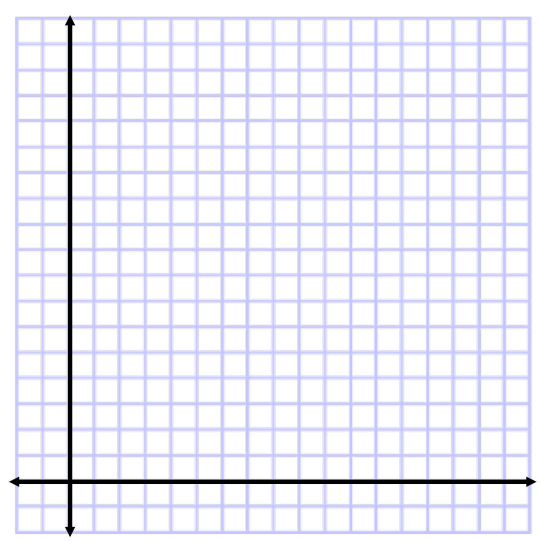


Write and Solve a System of Equations

In 1994, Guy Delage swam 2400 miles across the Atlantic Ocean from Cape Verde to Barbados. Everyday he would swim awhile and then rest while floating with the current on a huge raft. He averaged 44 miles per day.

Source: Banner Aerospace, Inc.

If Guy can swim 3 miles per hour for an extended period and the raft drifts about 1 mile per hour, how many hours did he spend swimming each day?



Assignment:

Pg. 372 #16-40 even, 42-45 (due Thursday)