Your Name

Mrs. T

10/1/2020

Notes

Lesson 1.4

Solving Systems of Two Equations

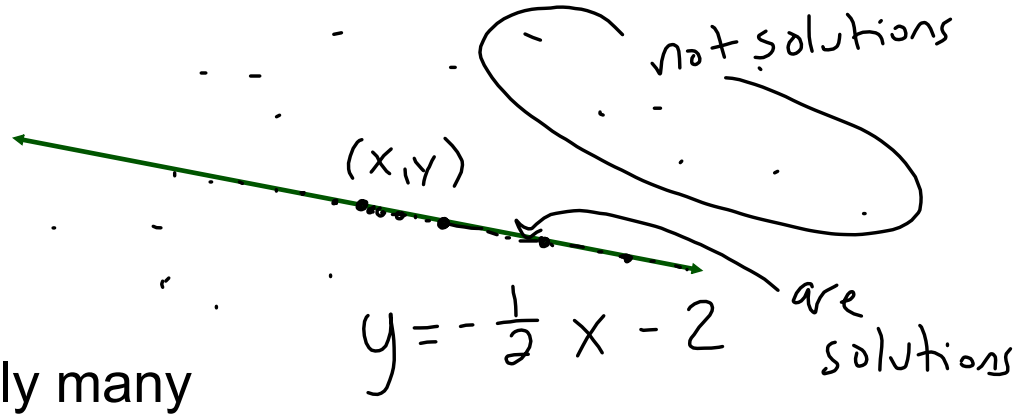
Objective: To be able to determine the solution types of a system of equations as well as what the solutions are using elimination.

Life Lesson: If a solution works for you and it works for some one else then it works for both of you and is THE solution to your problem.

Skill: We will be using these skills to solve 3 systems of linear equations as well as non-linear systems of equations.

Many real world problems can be solved by a system of equations and if you are good at them then you can bust it out to easily find the solution. The more variables that you must solve for the more equations you need to solve them with, and they can be linear, quadratic, cubic, or anything.

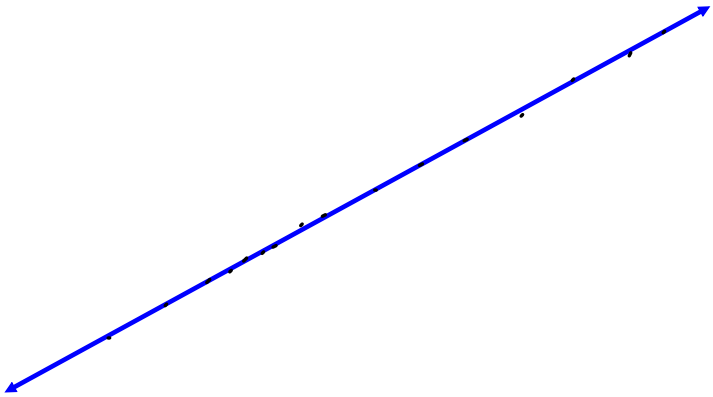
How many solutions does this have?



infinitely many

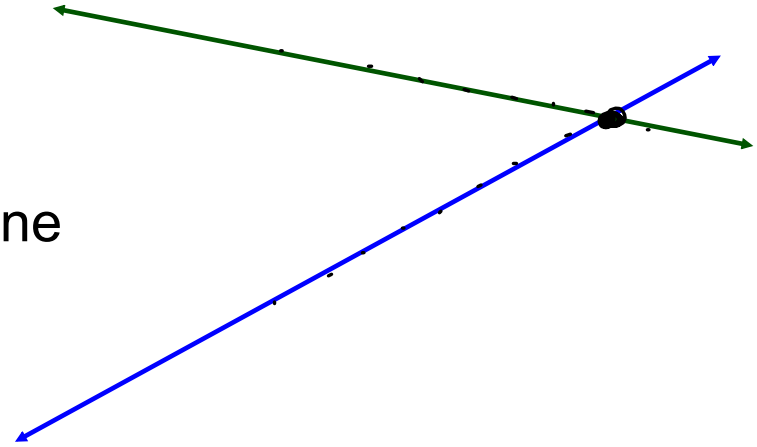
How many solutions does this have?

ıy



Is there any solution that works for both?

only one



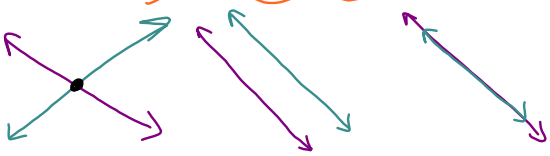
System of Equations

Two or more linear equations involving the same variables.

2 variables → need 2 equations
3 variables → need 3 equations

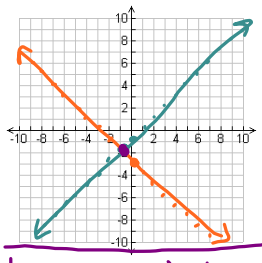
Solution to the System of Equations

Is an ordered pair that satisfies both equations (a point that is on **both** lines.



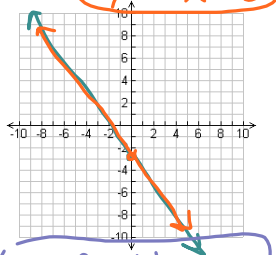
	1 Solution	No Solution	Infinitely Many Solutions
Graph equations:	Intersects at 1 point	No Intersection	Intersects Everywhere
	Slopes: different	Lines are parallel Slopes: same Y-intercept at different locations	Slopes: same Y-intercepts the same Lines are the same
Type of System	Consistent and Independent	Inconsistent	Consistent and Dependent
	there is a solution unique lines $x+y=2$ $2x+y=3$	no solution $x+y=2$ $2x+2y=5$	there are solutions not unique lines, but multiples of each other $x+y=2$ $2x+2y=4$

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



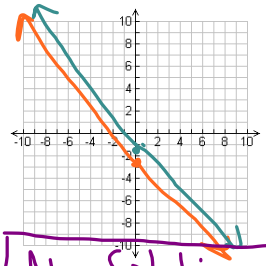
One Solution
(-1, -2)
Consistent & Independent System

2. $2x + 2y = -6$
   $y = -x - 3$
   $2x + 2y = -6$
   $-2x \quad -2x$
   $2y = -2x - 6$
   $y = -x - 3$



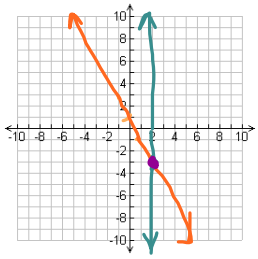
Infinitley Many Solutions
Consistent & Dependent

3. $y = -x - 3$
   $2x + 2y = 4$
   $-2x \quad -2x$
   $2y = -2x + 4$
   $y = -x + 2$



No Solution
Inconsistent

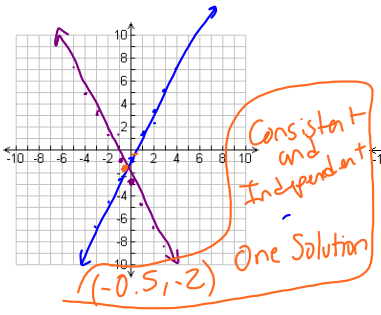
4. $x = 2$
   $2x + y = 1$
   $y = -2x + 1$



One solution
(2, -3)
Consistent & Independent System

Solve the system by graphing, explain solutions. Determine the type of system it is.

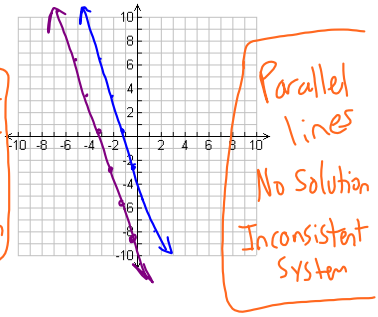
1. $y = -2x - 3$
   $y = 2x - 1$



Consistent and Independent
One Solution
(-0.5, -2)

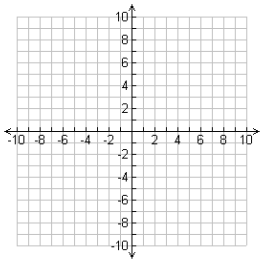
2. $3x + y = -9$ → $y = -3x - 9$
   $-3x \quad -3x$
   $y = -3x - 3$

$y = mx + b$

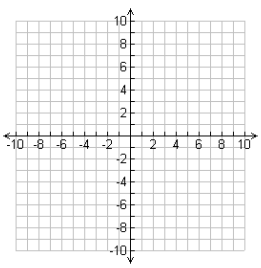


Parallel lines
No Solution
Inconsistent System

3. $y = -x - 3$
   $3x + 3y = 8$

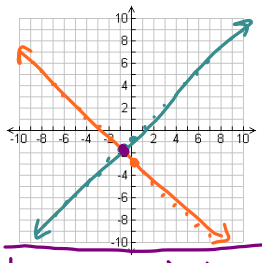


4. $x = 2$
   $2x + y = 1$



1. $y = -x - 3$

   $y = x - 1$

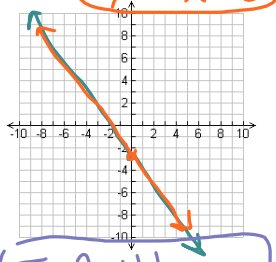


One Solution
(-1, -2)
Consistent & Independent System

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

   $y = -x - 3$

$2x + 2y = -6$
$-2x \quad -2x$
$2y = -2x - 6$
$y = -x - 3$

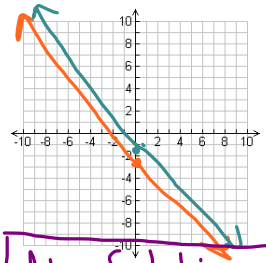


Infinitley Many Solutions
Consistent & Dependent

3. $y = -x - 3$

   $2x + 2y = 4$

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

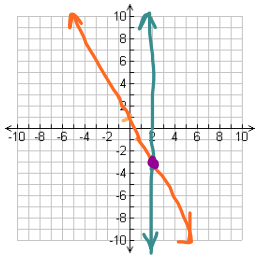


No Solution
Inconsistent

4. $x = 2$

   $2x + y = 1$

$y = -2x + 1$



One solution
(2, -3)
Consistent & Independent System

Day 2

Your Name

Mrs. T

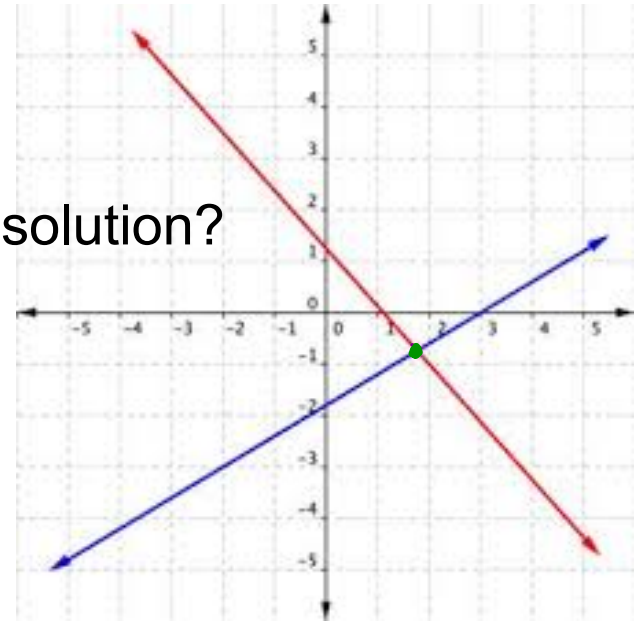
10/12/2020

Notes

Lesson 1.4

Solving Systems of Two Equations by Substitution

What is the solution?



Finding the solution using Substitution

*Use when one of the variables is already solved for

Step 1: Solve for one of the variables

Step 2: Plug the expression in for that variable into the second equation and solve for the other variable

Step 3: Solve for the variable that is left

Step 4: Substitute the solved variable in to one of the original equations to solve for the other.

ex. $y = 4x$ step 1 ✓
$3x - y = 1$

step 2 $3x - (4x) = 1$
step 3 $\frac{-x}{-1} = \frac{1}{-1}$
$x = -1$
step 4 $y = 4(-1)$
$y = -4$
$(-1, -4)$
One solution, Consistent & Independent System

ex. $x = 2y - 1$ step 1 ✓
$3x - 2y = 4$

step 2 distribute $3(2y-1) - 2y = 4$
step 3 $6y - 3 - 2y = 4$
$4y - 3 = 4$
$+3 \quad +3$
$\frac{4y}{4} = \frac{7}{4}$
$y = \frac{7}{4}$
step 4 $x = 2(\frac{7}{4}) - 1$
$x = 3.5 - 1$
$x = 2.5$
$(\frac{7}{4}, \frac{5}{4})$ or $(3.5, 2.5)$

$y = -x + 3$
$2y + 2x = 4$

$2(-x+3) + 2x = 4$
$-2x + 6 + 2x = 4$
$6 = 4$
No Solution
Parallel

$c - 4d = 1$ → $c = 4d + 1$
$+4d \quad +4d$
$2c - 8d = 2$

$2(4d+1) - 8d = 2$
$8d + 2 - 8d = 2$
$2 = 2$
Infinitely many solutions
Overlapping same line

$x - 2y = -5$
~~$x + 2y = -1$~~
$-2y \quad -2y$
$x = -2y - 1$

$(-2y-1) - 2y = -5$
$-4y - 1 = -5$
$+1 \quad +1$
$\frac{-4y}{-4} = \frac{-4}{-4}$
$y = 1$

$x = -2(1) - 1$
$x = -2 - 1$
$x = -3$
$(-3, 1)$

Solve the system by graphing, explain solutions.
Determine the type of system it is.

1. $y = -x + 3$ ✓ step 1
   $2y + 2x = 4$

$2(-x+3)+2x=4$

$-2x+6+2x=4$

$6=4$

False

No Solution
these are Parallel lines

2. $c - 4d = 1$
   $2c - 8d = 2$

What if variables canceled and $6=6$

True

Infinitely Many Solutions

3. $4x = 8y - 4$
   $3x - 2y = 4$

4. $x - 2y = -5$
   $x + 2y = -1$