Solving a System of Linear Equations by Substitution

Name _____

Date _____ Period _____

System of Equations

A system of equations is a group of equations with the same variables.

$3 + 2 = 5$ $3 - 5(2) = -7$	$x + y = 5$ $x - 5y = -7$	$2x + y = 3$ $3x - 2y = 8$	$2(2) + -1 = 3$ $3(2) - 2(-1) = 8$
✓	$(3,2)$	$(2,-1)$	✓
	Is a solution	Is a solution	

The solution to a system of equations is the ordered pair (x,y) that satisfies both equations

System of Equations

Three possible outcomes when solving a system by substitution

$x = 2$ $y = -3$	$5 = 5$	$5 \neq 19$
	True Statement	False Statement
One Solution (x,y) Consistent; Independent	Infinitely Many Solutions Consistent; Dependent	No Solutions Inconsistent

Solve the following system by substitution

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

Solve the following system by substitution

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

Solve the following system by substitution

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

Solve the following system by substitution

$x - 2y = -8$ $\quad$ $4x - 8y = -56$

Solve the following system by substitution

$5x - y = -3$ $\quad$ $15x - 3y = -9$

System of Equations

Solve one equation for one variable, then substitute that value into the other equation and solve.

Three possible outcomes when solving a system by substitution

$x = 2$ $y = -3$	$5 = 5$	$5 \neq 19$
	True Statement	False Statement
One Solution (x,y)	Infinitely Many Solutions	No Solutions
Consistent; Independent	Consistent; Dependent	Inconsistent