

Unit 6: day 4 notes: Solving Systems by Substitution

Name: _____

Objective: I can solve systems of equations by substitution.

Substitution Method:

$y = , x =$

- 1) Solve one of the equations for one of the variables.
- 2) substitute the expression for the variable into the other equation.
- 3) Solve for the variable that is left.
- 4) Substitute that answer into either of the original equations to find the value for the other variable.

5) Write answer as ordered pair (x, y)

Solve by substitution.

a) $y = -x + 4$

#2 $y = 3x$

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

$\frac{4x}{4} = \frac{4}{4}$

$x = 1$

#2 $x = 1$
 $y = 3x$

$y = 3(1)$

$y = 3$

$(1, 3)$ ✓

b) $3x + 6y = 18$

* $y = -\frac{1}{2}x + 3$

$3x + 6(-\frac{1}{2}x + 3) = 18$

$3x + (-3)x + 18 = 18$

$\frac{3x - 3x + 18}{0} = 18$

$18 = 18$ true

ininitely many solutions
* same line

c) $x = \frac{y}{4} + 1$

* $y = 4x - 5$

$$y = 4\left(\frac{y}{4} + 1\right) - 5$$

$$y = 1y + 4 - 5$$

$$0 = 4 - 5$$

$$0 \neq -1$$

No solution
parallel lines

Review: When solving systems of linear equations when do the following occur?

One solution: lines cross at one pt (x, y)

Infinitely many solutions: same line
true state. $18 = 18$

No solutions:

parallel lines same slope
y-int - diff $0 \neq -1$

slopes are same
y-int are same

Can you tell that there is no solution for a system by just looking at the equations? Explain and give an example if yes.

yes, i.e) $y = 2x + 6$ $m = 2$

$y = 2x - 3$ $m = 2$

slopes same, y-int different

How do you know that substitution gives the answer to a system of equations? Explain.

plugging in (x, y)
to both equation

Solve. If the difference in the side lengths of two squares is 10 and the sum of the side lengths is 18, what are the side lengths?