Algebra 2

Unit 0 Lesson 4: Solving Systems by Substitution

- Learn to solve systems by using Substitution.

"How to do" Substitution:

$$\begin{cases} x + y = 5 \\ y = 2x - 1 \end{cases}$$

1. Solve one of the equations for one of the variables. (You get to choose. Choose something easy for you to solve for! If one is already solved for, use it!)

$$y = 2x - 1$$

2. Plug that solution into the other equations variable and solve for the remaining variable.

$x + 2x - 1 = 5$

$3x - 1 = 5$

$+1 \quad +1$

$\frac{3x}{3} = \frac{6}{3}$

$x = 2$

$y = 2(2) - 1$

$= 3$

3. Plug that solution into either equation and solve for your remaining variable. Write your answer as an ordered pair. (x, y)

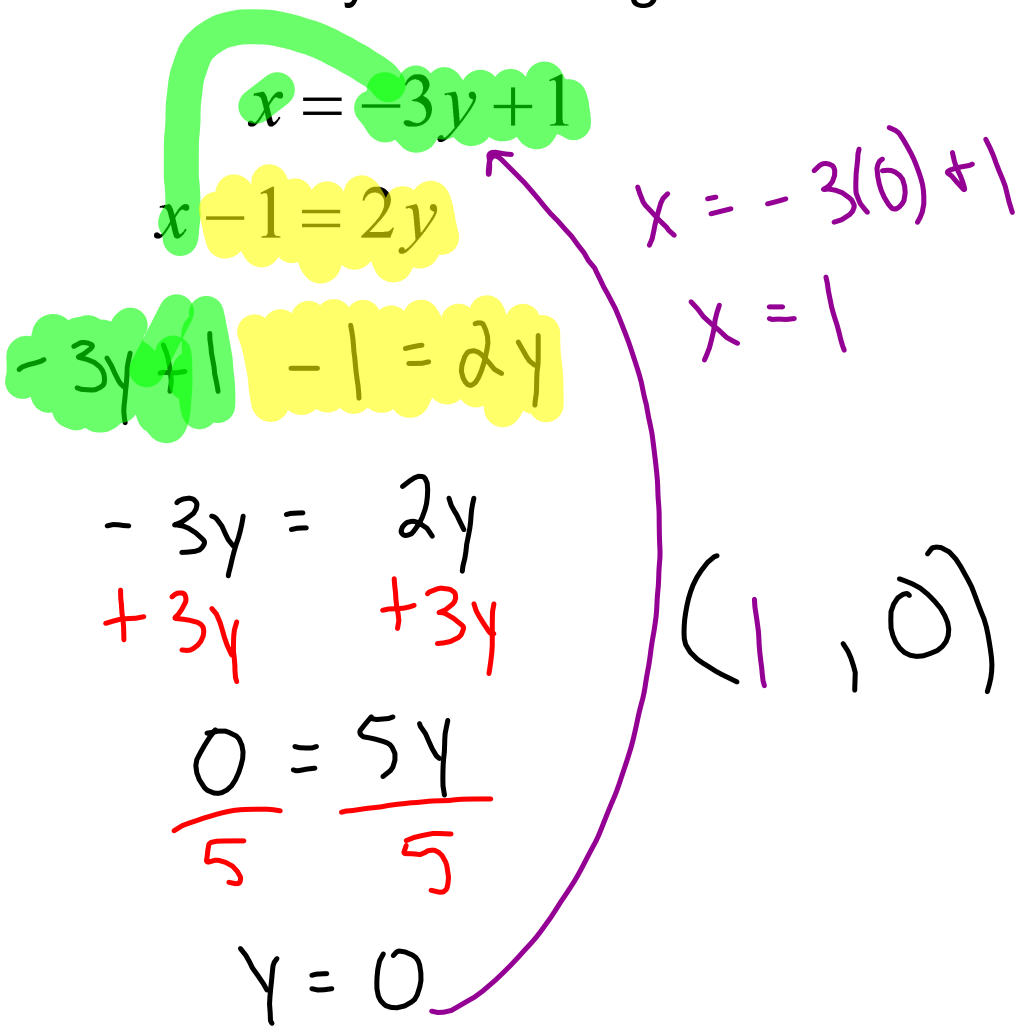
$(2, 3)$

When you should use this method over the graphing method:

1. If the equations are not already solved for y.
2. If the equations are already solved for variables.
3. If you don't have a calculator!

Now you try!

Example: Solve the system using substitution.



Odd situations: When Variables cancel themselves.

$$3x - 2y = 7$$

$$y = \frac{3}{2}x + 5$$

$$3x - \frac{2}{1}\left(\frac{3}{2}x + 5\right) = 7$$

$$3x - \frac{6}{2}x - 10 = 7$$

$$3x - 3x - 10 = 7$$

$$-10 = 7$$

When this happens, If the statement is TRUE, there are infinitely many solutions. If the statement is FALSE, there are NO solutions.

No Solutions

Last Example: Solve the System using substitution.

$x = 3y + 6$

$2x - 6y = 6$

$2(3y + 6) - 6y = 6$

$6y + 12 - 6y = 6$

$12 = 6$

No Sol. $\emptyset$

Homework:

Finish your Worksheet that was given to you Yesterday!

QA over this lesson Tomorrow towards the End of Class!