Name:		Date:
Topic/Objective: Solve linear systems by substitution		Class/Period:

How do you solve systems of linear equations by substitution?	
Questions/Main Ideas:	Notes:
Solving a linear system by substitution.	Step 1: Solve one equation for one of the variables. Step 2: Substitute the expression from step 1 into the other equation and solve the variable. Step 3: Substitute the value from step 2 into the revised equation from step 1 and solve.
Solve the system using the substitution method. **Example 1&2:**	$y = 3x + 2$ (1) $x + 2y = 11$ (2) $x + 2(3x+2) = 11$ $x + 6x + 4 = 11$ $7x + 4 = 11$ $-4 \quad -4$ $\dfrac{7x}{7} = \dfrac{7}{7}$ $\boxed{x = 1} \Rightarrow y = 3x + 2$ $ y = 3(1) + 2$ $ y = 3 + 2$ $ \boxed{y = 5}$ $(1, 5)$

$x - 2y = -6$ (1)
$4x + 6y = 4$ (2)

(1) $x - 2y = -6$
$+2y \quad +2y$
$ x = 2y - 6$ (3)

(2) $4x + 6y = 4$
$4(2y-6) + 6y = 4$
$8y - 24 + 6y = 4$
$14y - 24 = 4$
$+24 \quad +24$
$\dfrac{14y}{14} = \dfrac{28}{14}$

$\boxed{y = 2} \Rightarrow x = 2y - 6$
$ x = 2(2) - 6$
$(2, 2) \quad x = 4 - 6$
$ \boxed{x = -2}$

Guided practice	

Top-left:

$y = 2x + 5$ (1)
$3x + y = 10$ (2)

$3x + 2x + 5 = 10$
$5x + 5 = 10$
$\quad -5 \quad -5$

$\dfrac{5x}{5} = \dfrac{5}{5}$

$\boxed{x = 1} \Rightarrow y = 2x + 5$
$y = 2(1) + 5$
$y = 2 + 5$
$y = 7$

$\boxed{1, 7}$

Top-right:

$x - y = 3$ (1)
$x + 2y = -6$ (2)

(1) $x - y = 3$
$\quad +y \quad +y$
$x = y + 3$ (3)

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

$\dfrac{3y}{3} = \dfrac{-9}{3}$

$y = -3 \Rightarrow x = y + 3$
$\qquad\qquad x = -3 + 3$
$(0, -3) \quad x = 0$

Bottom-left:

$3x + y = -7$ (1)
$-2x + 4y = 0$ (2)

(1) $3x + y = -7$
$\quad -3x \qquad -3x$
$y = -3x - 7$ (3)

(2) $-2x + 4(-3x - 7) = 0$
$-2x - 12x - 28 = 0$
$-14x - 28 = 0$
$\quad +28 \quad +28$

$\dfrac{-14x}{-14} = \dfrac{28}{-14}$

$\boxed{x = -2} \Rightarrow (3) \; y = -3x - 7$
$y = -3(2) - 7$
$\boxed{y = -1}$

Bottom-right:

$\times \; y = x + 9$
$3x + 8y = -5$

$3x + 8(x + 9) = -5$
$3x + 8x + 72 = -5$
$11x + 72 = -5$
$\quad -72 \quad -72$

$\dfrac{11x}{11} = \dfrac{-77}{11}$

$\boxed{x = -7} \Rightarrow y = x + 9$
$\qquad\qquad y = -7 + 9$
$(-7, 2) \quad \boxed{y = 2}$

let $x = $ DVDS
let $y = $ books

Example 3:
David bought 3 DVDs and 4 books for $40 at a yard sale.
Anna bought 1 DVD and 6 books for $18. How much did
each DVD and book cost?

David $\quad 3x + 4y = 40$ (1)

Anna $\quad x + 6y = 18$ (2)

(2) $\quad x + 6y = 18$
$\qquad -6y \quad -6y$
$\qquad x = -6y + 18$ (3)

(1) $3(-6y + 18) + 4y = 40$

$-18y + 54 + 4y = 40$

$\quad -14y + 54 = 40$
$\qquad -54 \quad -54$

$-14y = -14$
$\dfrac{-14y}{-14} = \dfrac{-14}{-14}$

$\boxed{y = 1}$

(3) $x = -6y + 18$
$\quad x = -6(1) + 18$
$\quad x = -6 + 18$
$\boxed{x = 12}$

In Example 3, suppose David had spent $38 and Anna had
spent $22. What would the cost of a DVD and the cost of
a book have been then?

$3x + 4y = 38$ (1)
$x + 6y = 22$ (2)

(2) $x + 6y = 22$
$\quad -6y \quad -6y$
$\quad x = -6y + 22$ (3)

$3x + 4y = 38$

$3(-6y + 22) + 4y = 38$

$-18y + 66 + 4y = 38$

$-14y + 66 = 33$
$\qquad -66 \quad -66$

$\dfrac{-14y}{-14} = \dfrac{-28}{-14}$

$\boxed{y = 2} \Rightarrow$ (3)

$x = -6y + 22$
$x = -6(2) + 22$
$\boxed{x = 10}$

Summary: