Solving by Substitution

Substitution: solve one equation for a variable, put that expression into the other, solve the one-variable equation, back-substitute, check the pair in both.

Name _____ Date _____

Words we use

say the math word, then the plain English

WORD	PLAIN ENGLISH	WHAT YOU DO
Substitution	Put one equation's expression in place of the same variable in the other equation.	Use parentheses. Now there is one variable.
Back-substitute	Use the value you found to get the other variable, in the equation that was already solved.	One move, then check the pair in both.
Solve for a variable	Get x or y alone on one side (Unit 1).	Pick the one that comes free most easily.
One variable	After substituting, the equation is a Unit 1 equation.	Distribute, combine, add opposites, multiply by the reciprocal.
Check the pair	Put both numbers into both original equations.	Both true, or something slipped.

Part A Already solved for one variable

Substitute, solve, back-substitute, check.

1. $y = 3x - 1$ and $2x + y = 9$

2. $x = y + 4$ and $x + 2y = 10$

3. $y = -x + 6$ and $3x - y = 2$

Part B Solve one first

Pick the variable that comes free most easily. Say which one.

1. $x + y = 7$ and $2x - y = 2$

2. $x + 3y = 11$ and $2x - y = 1$

3. $y = 2x$ and $y = -x + 5$ (a fraction answer)

Part C In your own words

1. Why are you allowed to put one equation's expression into the other?

2. What does substitution turn the system into, and which unit taught you to solve that?

3. Why use parentheses when you substitute?

Part D Exit ticket

1. The five steps, in order:

2. Solve $y = x + 2$ and $3x + y = 10$:

Answer key

Part A. 1. (2, 5). 2. (6, 2). 3. $3x - (-x + 6) = 2$, $4x = 8$, $x = 2$, $y = 4$: (2, 4).

Part B. 1. $y = 7 - x$; (3, 4). 2. $x = 11 - 3y$; $2(11 - 3y) - y = 1$, $y = 3$, $x = 2$: (2, 3). 3. $2x = -x + 5$, $x = 5/3$, $y = 10/3$.

Part C. 1. The solution satisfies both, so the variable is the same number in both. 2. One equation in one variable; Unit 1. 3. The whole expression is multiplied or subtracted, so it must be distributed.

Part D. 1. Solve one, substitute, solve, back-substitute, check. 2. (2, 4).