Solving A System of Equations Algebraically

A system of equations is two equations with two unknowns. There are two methods to solving a system algebraically. Once you have learned both methods, YOU will make the decision which method is the BEST choice to solve the problem.

The basic premise of both methods is to create ONE equation with only one variable, solve it, then, substitute to find the other variable.

Method 1: Substitution	Method 2: Using Addition to Eliminate a Variable
1: This method is the best choice if one of the equations is already in or is easy to get into "y =" or "x =" format. 2: Once one of the equations is in that format, **substitute** for that variable in the other equation. Doing this results in one equation with one variable, which can be solved quite easily. 3: Solve this equation for the remaining variable. 4: Substitute that answer into one of the original equations to find the other variable. 5: Your answer is written as an ordered pair, (x, y). 6: Check your answers in BOTH equations.	1: The equations must first both be in the same format. 2: The coefficient of **either** both x's **or** both y's must be opposites of each other. (for example, -2 & 2) 3: If they are, move to step 4. If they are not, use multiplication to make them opposites, then move to step 4. BE VERY CAREFUL TO MAKE SURE YOU MULTIPLY THE ENTIRE EQUATION(S)!! 4: Use **addition to eliminate** that variable. 5: Solve the new equation for the remaining variable. 6: Substitute that answer into one of the original equations to find the other variable. 7: Your answer is written as an ordered pair, (x, y) 8: Check your answers in BOTH equations.

Example: Solve the following system of equations algebraically and check: $4x + 3y = 27$ $y = 2x - 1$	Check in both equations	Example: Solve the following system of equations algebraically and check: $4x - 2y = 12$ $x + 2y = 8$	Check in both equations

1. $2x + y = 5$
   $y = x - 4$

2. $y = x + 5$
   $4x + y = 20$

3. $x = 2y + 4$
   $2x + 4y = 24$

4. $6x - 3y = 15$
   $x + 3y = -8$

5. $x - 3y = -15$
   $5x + 3y = -3$

6. $6x + 2y = 14$
   $3x + 2y = 8$

7. $2x + 6y = 6$
   $2x - y = -8$

8. $x + 2y = 7$
   $4x + 3y = 3$

9. $3x - y = -1$
   $5x - y = 3$

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