

The substitution method is one of the algebraic ways of solving systems of equations. Precise solutions are obtained by algebraic methods. The substitution method is an efficient way of solving systems of equations in which one equation has a variable with a numerical coefficient of 1.

### **Procedure for Solving Systems of Equations by Substitution**

1. Solve one of the equations for one of the variables (if a variable has a coefficient of 1 use that one).
2. Substitute the solution from step 1 into the other equation and solve for the remaining variable.
3. Substitute the value from step 2 into the equation from step 1 and solve for the other variable.
4. Check by substituting the values into both equations.

Example:  $2x + y = 14$

$$4x - 2y = -12$$

- 1) Solve  $2x + y = 14$  for  $y$ .

➤  $2x + y = 14$

➤  $y = -2x + 14$

- 2) Substitute  $-2x + 14$  in for  $y$  in the other equation

➤  $4x - 2y = -12$

➤  $4x - 2(-2x + 14) = -12$

➤  $4x + 4x - 28 = -12$

➤  $8x - 28 = -12$

➤  $8x = 16$

➤  $x = 2$

- 3) Substitute 2 in for  $x$  into the equation from step 1.

➤  $y = -2(2) + 14$

➤  $y = -4 + 14$

➤  $y = 10$

➤ Solution is **(2, 10)**

**Jadwin-Technical Math A-7<sup>th</sup> Period-Off Site Learning Packet Day 6**

**Solving Systems of Equations by Substitution Part 1**

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Solve each of the following systems of equations by the substitution method.

1. 
$$\begin{cases} x=y+4 \\ 3x+7y=18 \end{cases}$$

2. 
$$\begin{cases} x=y-1 \\ 3x+2y=-13 \end{cases}$$

3. 
$$\begin{cases} x=2y \\ 7y-4x=-3 \end{cases}$$

4. 
$$\begin{cases} x=4y \\ x-5y=2 \end{cases}$$

5. 
$$\begin{cases} x=y+3 \\ 2y-x=-5 \end{cases}$$

6. 
$$\begin{cases} y=3x+2 \\ 9x-7y=22 \end{cases}$$