<u>Solving Linear Systems Using Substitution</u>

Solving a linear system by ***substitution*** is an algebraic method that gives ***exact solutions***. Since a solution to a linear system is the point that satisfies **<u>BOTH</u>** equations, the x-value and the y-value of the point must be the same for each equation. This means that we can substitute the value of x and/or y from one equation into the other.

Steps for Solving a Linear Systems using ***<u>Substitution</u>***:

<u>Example</u>:

$2x + y = 10$ ① $y - 2 = 2x$ ②	Label the equations.
From eq'n ②, isolate y: $y = 2x + 2$ ③	Isolate a variable in the "***easiest***" equation by rearranging *one* of the equations. Label this new, ***equivalent***, equation.
Substitute eq'n ③ into eq'n ①: $2x + y = 10$ ← eq'n① $2x + (2x + 2) = 10$ ← eq'n③subst. $2x + 2x + 2 = 10$ $4x + 2 = 10$ $4x = 10 - 2$ $4x = 8$ $x = \frac{8}{4}$ $x = 2$	Substitute the equation from the previous step into the other equation (the one you have not yet used) and solve for the remaining variable.
Sub. $x = 2$ into ②: $y - 2 = 2(2)$ $y - 2 = 4$ $y = 4 + 2$ $y = 6$ $\therefore \textbf{\textit{The solution is}}\ (2, 6)$.	Substitute your answer from the previous step into the original equation to solve for the remaining variable (the one you rearranged for earlier).

Reflect: Why do you think this method is called the SUBSTITUTION method?

Use the steps and example provided to complete the following question:

Use Substitution to solve this linear system. CHECK YOUR ANSWER.

$2x + 3y - 9 = 0$
$x - y - 2 = 0$

Practice:

- **Page 38:** 3, 5c, 8, 9bc, 10, 16, 17, 19 (challenge)