AChor/MFM2P **Name: _____**

Date: _____

Worksheet 6-4: Solving Linear Systems by Substitution

Steps for Solving a System of Two Equations in *x* and *y* by Substitution:

Step 1: Using either equation, solve for one variable in terms of the other.
(Choose the equation that can be solved easier: where the coefficient of *x* or *y* is 1)

Step 2: Substitute the new expression for *x* or *y* into the remaining equation and solve.

Step 3: Substitute the value for *x* or *y* back into one of the original equations to determine the value of the other variable.

Practice:

1. Solve *x* in terms of *y*.

(a) $x + 4y = 13$ (b) $2x - 4y = 12$ (c) $-2y + x = -5$

2. Solve *y* in terms of *x*.

(a) $y + 8 = 3x$ (b) $-x - y = -5$ (c) $3y - 9x = 18$

3. Solve the following systems of equations by substitution.

(a) $\begin{aligned} x - 2y &= 7 \\ 2x - 3y &= 13 \end{aligned}$

(b) $\begin{aligned} 2x + y &= 2 \\ -x + 2y &= -1 \end{aligned}$

(c) $\begin{aligned} 3x - 2y &= 6 \\ x + y &= -3 \end{aligned}$

Answers: **1.** (a) $x = 13 - 4y$, (b) $x = 6 + 2y$, (c) $x = -5 + 2y$ or $x = 2y - 5$;
2. (a) $y = 3x - 8$, (b) $y = -x + 5$ or $y = 5 - x$, (c) $y = 6 + 3x$;

4. Solve the following systems of equations by substitution.

(a) $-4x + y = 6$
$-5x - y = 21$

(b) $-7x - 2y = -13$
$x - 2y = 11$

(c) $\begin{aligned} -2x - y &= -9 \\ 5x - 2y &= 18 \end{aligned}$

(d) $\begin{aligned} -3x + 3y &= 4 \\ -x + y &= 3 \end{aligned}$

Answers: **3.** (a) The solution is $(5, -1)$, (b) The solution is $(1, 0)$, (c) The solution is $(0, -3)$**;**
4. (a) The solution is $(-3, -6)$, (b) The solution is $(3, -4)$, (c) The solution is $(4, 1)$, (d) no solution