Lesson Notes 6-5 **Solving by Elimination Part I**

If it is difficult to isolate a variable we can use the elimination or addition/subtraction method to solve the system of equations. Solve for x in the following two equations:

$x + 8 = 100$

$x = 92$

$2x + 16 = 200$

$2x = 184$

$x = 92$

Multiplying both sides of an equation by a constant (number) does not affect the answer. We use this property of linear equation in the elimination method because in order for this method to work we must have the same coefficient but opposite in sign for one of the variables (the number in front of the x or y must be the same). If it isn't we must multiply either one or both of the equations by a number to acquire this. Solve the following using the elimination method:

Step

$-2(x + 3y = 40)$
$2x + 4y = 90$

1. Obtain equal but opposite coefficients in front of one variable.

$-2x - 6y = -80$
$2x + 4y = 90$

2. Add this new equation and the second original equation.

$\frac{-2y}{-2} = \frac{10}{-2}$

$y = -5$

3. Solve for x and y.

$x + 3(-5) = 40$

$x - 15 = 40$

$x = 55$

Examples: Solve the following by the addition method.

1. $3x - 5y = -9$
$4x + 5y = 23$

$7x = 14$

$x = 2$

$3(2) - 5y = -9$

$6 - 5y = -9$

$-5y = -15$

$y = 3$

2. $2(x - 2y = 7)$
$3x + 4y = 1$

$2x - 4y = 14$
$3x + 4y = 1$

$\frac{5x}{5} = \frac{15}{5}$

$x = 3$

$3 - 2y = 7$

$-2y = 4$

$y = -2$