Lesson Title 4.3 Solving Linear Systems by Elimination NOTES **B2A2 Date** _____

A **system of linear equations** is to or more linear equations (the x has an exponent of 1)
A **solution** to a system of two equations is the point of intersection
An **ordered pair** is the same as a coordinate or point (x, y)

OBJECTIVE 1: Using the Addition/Elimination Method
Elimination is more accurate than graphing.
STEPS:

1. Rewrite each equation in standard form, Ax + By = C.
2. If necessary, multiply one or both equations by a nonzero number so that the coefficients of a chosen variable in the system are opposites: - 2 and + 2.
3. Add the equations.
4. Find the value of one variable by solving the resulting equation from STEP 3.
5. Find the value of the second variable by substituting the value found in STEP 4 into either of the original equations.
6. Check the proposed solution in the original system.

$x + y = 7$
$+\ x - y = 5$

$2x = 12$
$\frac{2x}{2} = \frac{12}{2}$
$x = 6$

$6 + y = 7$
$-6 \quad -6$
$y = 1$

$(6, 1)$

$6 + 1 = 7$ ✓
$6 - 1 = 5$ ✓

$-2x + y = 2$
$(-x + 3y = -4)\ -2$

$-2x + (2) = 2$
$+2 \quad +2$
$-2x = 4$
$\frac{-2x}{-2} = \frac{4}{-2}$
$x = -2$

$-2x + y = 2$
$+\ 2x - 6y = 8$
$-5y = 10$
$\frac{-5y}{-5} = \frac{10}{-5}$
$y = -2$

$(-2, -2)$

$-2(-2) + (-2) = 2$ ✓
$-(-2) + 3(-2) = -4$ ✓

$x - 2y = 11$

$-2(3x - y = 13)$

$x - 2y = 11$

$+ \quad -6x + 2y = -26$

$-5x = -15$

$x = 3$

$3 - 2y = 11$

$-2y = 8$

$y = -4$

$(3, -4)$

$3 - 2(-4) = 11$ ✓

$3(3) - (-4) = 13$ ✓

$(2x - y = 7)(-4)$

$8x - 4y = 1$

$-8x + 4y = -28$

$8x - 4y = 1$

$0 \neq -27$

$\{\}, \emptyset$ or no solution

$3(3x - 2y = 2)$

$-9x + 6y = -6$

$9x - 6y = 6$

$-9x + 6y = -6$

$0 = 0$ ✓

∞, infinite solutions

$(3x + 4y = 13)9$

$(5x - 9y = 6)4$

$27x + 36y = 117$

$+ \quad 20x - 36y = 24$

$47x = 141$

$\frac{47x}{47} = \frac{141}{47}$

$x = 3$

$(3, 1)$

$3(3) + 4(1) = 13$ ✓

$5(3) - 9(1) = 6$ ✓

$3(3) + 4y = 13$

$4y = 4$

$y = 1$

$(4x + 3y = 14)2$

$(3x - 2y = 2)3$

$8x + 6y = 28$

$+ \quad 9x - 6y = 6$

$17x = 34$

$x = 2$

$(2, 2)$

$4(2) + 3(2) = 14$ ✓

$3(2) + -2(2) = 2$ ✓

$4(2) + 3y = 14$

$8 + 3y = 14$

$3y = 6$

$y = 2$

$(-2x + \frac{3y}{2} = 5)2$

$(\frac{x}{2} - \frac{y}{4} = \frac{1}{2})4$

$-4x + 3y = 10$

$2(2x - y = 2)$

$-4x + 3y = 10$

$+ \quad 4x - 2y = 4$

$y = 14$

$2x - 14 = 2$

$2x = 16$

$x = 8$

$(8, 14)$

$-2(8) + \frac{3(14)}{2} = 5$ ✓

$\frac{8}{2} - \frac{14}{4} = \frac{1}{2}$ ✓

Still need help with: