Algebra I: Solving Systems of Equations
Notes: Elimination Method

Name:_____

Goal: Add or subtract our equations in order to _____ a variable.

- Make sure to write equations vertically (stacked) in **standard form.**

To solve by Elimination:

Step 1	Choose a variable to eliminate (X or Y).
Step 2	Eliminate that variable by adding or subtracting one equation from another. (sometimes you have to multiply first)
Step 3	Solve the new equation.
Step 4	Plug in your answer to find the other variable.
Step 5	Check your answer.

- Three types of solutions: 1 solution, no solution, infinite solutions.
  What might those look like???

Consider the systems below:

1) $2x - 10y = 22$
$+\ \ 2x - 3y = 30$

$-13y = 52$
$\frac{-13y}{-13} = \frac{52}{-13}$
$y = -4$

$2x - 10(-4) = 22$
$2x + 40 = 22$
$2x = -18$
$x = -9$

$\boxed{(-9, -4)}$

2) $6x + 2y = 2$
$9x - 2y = 28$

$15x = 30$
$x = 2$

$6(2) + 2y = 2$
$12 + 2y = 2$
$2y = -10$
$y = -5$

$\boxed{(2, -5)}$

3) $4x + 3y = 17$
$-\ 4x + 9y = 11$

$-6y = 6$
$y = -1$

$4(5) + 3y = 17$
$20 + 3y = 17$
$3y = -3$
$y = -1$

$4x + 3(-1) = 17$
$4x - 3 = 17$
$4x = 20$
$\boxed{x = 5}$

$\boxed{(5, -1)}$

4) $10x + 8y = -24$
$-(-2x + 8y = 24)$

$12x = -48$
$x = -4$

$10(-4) + 8y = -24$
$-40 + 8y = -24$
$+40 \qquad +40$
$8y = 16$
$y = 2$

$\boxed{(-4, 2)}$

5) $9x + 3y = -6$
$3(18x - y = 2)$

$9x + 3y = -6$
$54x - 3y = 6$

$63x = 0$

$9(0) + 3y = -6$ $\quad x = 0$
$3y = -6$ $\quad y = -2$

$\boxed{(0, -2)}$

6) $(4x + 7y = -15)2$
$-8x - 14y = 10$

$8x + 14y = -30$

$0 = -20$

$\boxed{\text{No Solution}}$

7) $(-2x - 4y = -8)3$
$(7x + 3y = 28)4$

$-6x - 12y = -24$
$28x + 12y = 112$

$\boxed{(4, 0)}$

$22x = 88$
$x = 4$
$7(4) + 3y = 28$
$y = 0$

8) $(-3x - 4y = -26)3$
$(-2x + 3y = 11)4$

$-9x - 12y = -78$
$-8x + 12y = 44$

$-17x = -34$
$x = 2$
$-2(2) + 3y = 11$
$y = 5$

$\boxed{(2, 5)}$

9) $14x - 10y = -24$
$-2(7x + 8y = 1)$

$14x - 10y = -24$
$-14x - 16y = -2$

$-26y = -26$
$y = 1$
$7x + 8(1) = 1$
$7x = -7$
$x = -1$

$\boxed{(-1, 1)}$

10) $(3x - 8y = 14)4$
$(4x - 7y = 4)-3$

$12x - 32y = 56$
$-12x + 21y = -12$

$-11y = 44$
$y = -4$

$\boxed{(-6, -4)}$

$3x - 8(-4) = 14$
$3x + 32 = 14$
$x = -6$