5.3 NOTES - Solving Systems of Two Linear Equations by Elimination

LESSON 5.3 - Solving Systems of Two Linear Equations by Elimination

• **GRAPHING** a system of linear equations allows us to ESTIMATE the solution of the system.

• Solving a system of linear equations by the **SUBSTITUTION** method allows us to find an EXACT solution, but it is only efficient if there is a "bare" variable.

• The **ELIMINATION** method allows us to find an EXACT solution of a system of linear equations no matter what the equations look like.

SOLVING BY ELIMINATION

STEP 1: Multiply one or both of the equations by a constant to obtain coefficients that are the opposite of each other.

STEP 2: Add the revised equations from STEP 1. Combining like terms will *eliminate* one of the variables. Solve for that variable.

STEP 3: Substitute the value you found in STEP 2 into either of the original equations to solve for the remaining variable.

Solve this system of equations.

$-5x + 7y = 11$

$5x - 3y = -19$

$$\frac{4y}{4} = \frac{-8}{4}$$

$y = -2$

$-5x + 7(-2) = 11$

$-5x - 14 = 11$

$+14 \quad +14$

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

$x = -3$

$(-3, -2)$

Solve this system of equations.

$-1(6x + 5y) = (9)(-1)$

$6x - 2y = 30$

$-6x - 5y = -9$

$6x - 2y = 30$

$$\frac{-7y}{-7} = \frac{21}{-7}$$

$y = -3$

$6x + 5(-3) = 9$

$6x - 15 = 9$

$+15 \quad +15$

$$\frac{6x}{6} = \frac{24}{6}$$

$x = 4$

$(4, -3)$

Solve this system of equations.

$2(5x + 3y) = (11)2$

$-2x - 6y = 10$

$10x + 6y = 22$

$-2x - 6y = 10$

$$\frac{8x}{8} = \frac{32}{8}$$

$x = 4$

$5(4) + 3y = 11$

$20 + 3y = 11$

$-20 \qquad -20$

$$\frac{3y}{3} = \frac{-9}{3}$$

$x = -3$

$(-3, 4)$

5.3 NOTES - Solving Systems of Two Linear Equations by Elimination

Solve this system of equations.

$-3(2x - 7y) = (-10)(-3)$

$2(3x + 2y) = (10)2$

$-6x + 21y = 30$

$6x + 4y = 20$

$\dfrac{25y}{25} = \dfrac{50}{25}$

$y = 2$

$2x - 7(2) = -10$

$2x - 14 = -10$

$\quad +14 \quad +14$

$\dfrac{2x}{2} = \dfrac{4}{2}$

$x = 2$

$(2, 2)$

Solve this system of equations.

$5(5x - 2y) = (-15)5$

$2(7x + 5y) = (18)2$

$25x - 10y = -75$

$14x + 10y = 36$

$\dfrac{39x}{39} = \dfrac{-39}{39}$

$x = -1$

$5(-1) - 2y = -15$

$-5 - 2y = -15$

$\quad +5 \qquad +5$

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

$y = -5$

$(-1, -5)$

Solve this system of equations.

$-2(3x + 8y) = (-15)(-2)$

$3(2x - 7y) = (-10)3$

$-6x - 16y = 30$

$6x - 21y = -30$

$\dfrac{-37y}{-37} = \dfrac{0}{-37}$

$y = 0$

$3x + 8(0) = -15$

$\dfrac{3x}{3} = \dfrac{-15}{3}$

$x = -5$

$(-5, 0)$

Solve this system of equations.

$3(5x + 6y) = (12)3$

$2(7x - 9y) = (11)2$

$15x + 18y = 36$

$14x - 18y = 22$

$\dfrac{29x}{29} = \dfrac{58}{29}$

$x = 2$

$5(2) + 6y = 12$

$10 + 6y = 12$

$-10 \qquad -10$

$\dfrac{6y}{6} = \dfrac{2}{6}$

$x = \dfrac{1}{3}$

$\left(\dfrac{1}{3}, 2\right)$

HOMEWORK:

5.3 Worksheet - Solving Systems of Two Linear Equations by Elimination