Day 4 Elimination Using Multiplication

(# in front of variable)

Sometimes our coefficients are not the same and we have to multiply to create opposites before we can use elimination.

Step 1: Write the equations so variables are lined up.

Step 2: Multiply one or both of the equations by a number to obtain coefficients that are opposites for one of the variables.

Step 3: Add the equations to eliminate one of the variables

Step 4: Solve the equation for the remaining variable.

Step 5: substitute the value obtained in Step 4 into either one of the original equations and solve for the other variable.

Step 6: Write the solution as an ordered pair.

(x, y)

Example 1

$5x + 6y = -8$

~~$2x + 3y = -5$~~ $\cdot 2$

$4x + 6y = -10$

$5x + 6y = -8$

$-\ 4x + 6y = +10$

$x = 2$

$5(2) + 6y = -8$

$10 + 6y = -8$

$-10 \quad -10$

$\frac{6y}{6} = \frac{-18}{6}$

$y = -3$

(x, y)

$(2, -3)$

Example 2

$6x - 2y = 10$

$3x - 7y = -19$ $\cdot 2$

$6x - 2y = 10$

$-\ 6x + 14y = +38$

$\frac{12y}{12} = \frac{48}{12}$

$y = 4$

$6x - 2(4) = 10$

$6x - 8 = 10$

$+8 \quad +8$

$\frac{6x}{6} = \frac{18}{6}$

$x = 3$

$(3, 4)$

Solve the system

$$2x+7y=1$$
$$x+5y=2$$

Sometimes we will have to multiply both equations by a different number in order to have like terms. eliminate

Example 3

$$4x+2y=8 \quad \cdot 3$$
$$3x+3y=9 \quad \cdot 2$$

$12x+6y=24$

$6x+6y=18$

$6y$

$6(1)+6y=18$

$(1,2)$ $-6+6y=18$ -6

$6y=12$ $y=2$

$\frac{6x}{6}=\frac{6}{6}$ $x=1$

Example 4

$$5x - 3y = 6$$
$$2x + 5y = -10$$

Example 5 A buffet has one price for adults and another price for children. The Taylor family has 2 adults and 3 children and their bill was $40.50. The Wong family has 3 adults and 1 child and their bill was $38. What is the price for adults and children at the buffet?