Lesson 16   Solving Systems Using Elimination

Steps to Follow: **Elimination Method**

1. Put both equations in standard form;   Ax + By = C
2. Pick one variable to eliminate.
   a. Look for variables that have the same coefficient, but opposite signs.
   b. If you cannot find that, make it.
      i. Look for a number that both coefficients can become (by multiplying).
      ii. Multiple each equation by a value that will produce the desired coefficient.
      iii. make sure the coefficients have opposite signs.
         (If they don't, multiply one equation by negative one.)
3. Add the equations together. One variable should cancel out.
4. Solve the remaining equation for just the remaining variable.
5. Substitute the value that you found back into one of the original equations in order to solve for the second variable.
6. List your answer as an ordered pair.

Examples: Solve by Elimination

1. $\begin{cases} 5x - 6y = -32 \ \text{①} \\ 3x + 6y = 48 \ \text{②} \end{cases}$

$\dfrac{8x}{8} = \dfrac{16}{8}$

$x = 2$

$\boxed{(2,7)}$

① $5(2) - 6y = -32$

$10 \quad -6y = -32$
$-10 \qquad\quad -10$

$\dfrac{-6y}{-6} = \dfrac{-42}{-6}$

$y = 7$

2. $\begin{cases} 2x + 5y = -22 \ \text{①} \cdot (-5) \\ 10x + 3y = 22 \ \text{②} \end{cases}$

$-10x - 25y = 110 \ \text{①}$
$10x + 3y = 22 \ \text{②}$

$\dfrac{-22y}{-22} = \dfrac{132}{-22}$

$y = -6$

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

② $10x + 3(-6) = 22$

$10x - 18 = 22$
$\qquad +18 \quad +18$

$\dfrac{10x}{10} = \dfrac{40}{10}$

$x = 4$

3. $\begin{cases} 4x = -2y + 14 \ \text{①} \\ 7x - 3y = -8 \ \text{②} \end{cases}$

$4x = -2y + 14 \ \text{①}$
$+2y \quad +2y$

$4x + 2y = 14 \ \text{①} \cdot (3)$
$7x - 3y = -8 \ \text{②} \cdot (2)$

$12x + 6y = 42 \ \text{①}$
$14x - 6y = -16 \ \text{②}$

$\dfrac{26x}{26} = \dfrac{26}{26}$

$x = 1$

① $4x + 2y = 14$

$4(1) + 2y = 14$

$4 + 2y = 14$
$-4 \qquad\quad -4$

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

$y = 5$

$\boxed{(1,5)}$