

Warm Up...

Solve the following systems of equations:

$$\begin{aligned} y &= 2x - 3 \\ -4x + 3y &= -1 \end{aligned}$$

???

$$\begin{aligned} -4x + 3(2x - 3) &= -1 \\ -4x + 6x - 9 &= -1 \\ 2x &= 9 - 1 \\ 2x &= 8 \\ x &= 4 \\ y &= 2x - 3 \\ &= 2(4) - 3 \\ &= 8 - 3 \\ &= 5 \\ &= 5 \\ (4, 5) \end{aligned}$$

$$\begin{aligned} 3x + 4y &= 15 \\ y &= 6x - 3 \end{aligned}$$

???

$$\begin{aligned} 3x + 4(6x - 3) &= 15 \\ 3x + 24x - 12 &= 15 \\ 27x &= 12 + 15 \\ 27x &= 27 \\ x &= 1 \\ y &= 6x - 3 \\ &= 6(1) - 3 \\ &= 6 - 3 \\ &= 3 \\ (1, 3) \end{aligned}$$

$$\begin{aligned} x - 5y &= -7 \\ 5x + 2y &= -8 \end{aligned}$$

???

$$\begin{aligned} x &= 5y - 7 \\ 5(5y - 7) + 2y &= -8 \\ 25y - 35 + 2y &= -8 \\ 27y &= 35 - 8 \\ 27y &= 27 \\ y &= 1 \\ x &= 5y - 7 \\ &= 5(1) - 7 \\ &= 5 - 7 \\ &= -2 \\ (-2, 1) \end{aligned}$$

Solving Systems of Equations Using Elimination Method

Objective is to "ELIMINATE" one of the variables by either adding or subtracting the two equations.

EXAMPLE #1:

$$\begin{aligned} -4x + 3y &= -4 \\ 4x - y &= 12 \end{aligned}$$

$$\begin{aligned} 2y &= 8 \\ y &= 4 \\ 4x - y &= 12 \\ 4x - 4 &= 12 \\ 4x &= 16 \\ x &= 4 \\ (4, 4) \end{aligned}$$

STEPS...

- 1) Put equations in the Standard Form.

$$Ax + By = C$$

NOTE: Number the equations!!!

- 2) Multiply equation(s) to get a common coefficient for either x or y terms.
- 3) Add OR Subtract equations to ELIMINATE the terms.
- 4) SOLVE remaining equation for unknown
- 5) Back substitute to get other unknown

EXAMPLE #2:

$$\begin{array}{r} -2x + 6y = -18 \\ 4x - 6y = 12 \\ \hline \end{array}$$

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

$$x = -3$$

$$\begin{array}{r} -2x + 6y = -18 \\ -2(-3) + 6y = -18 \\ 6 + 6y = -18 \\ 6y = -24 \\ y = -4 \\ (-3, -4) \end{array}$$

EXAMPLE #3 - Coefficients are the same sign...

$$\begin{array}{r} 3x - y = -11 \\ 3x - 5y = -7 \\ \hline \end{array}$$

$$\begin{array}{r} 4y = -4 \\ y = -1 \\ 3x - y = -11 \\ 3x - (-1) = -11 \\ 3x + 1 = -11 \\ 3x = -12 \\ x = -4 \\ (-4, -1) \end{array}$$

EXAMPLE #4: What if none of the coefficients are the same???

$$\begin{array}{r}
 x + 12y = 9 \quad \textcircled{1} \\
 -2x - 6y = 0
 \end{array}
 \quad
 \begin{array}{r}
 \textcircled{1} \times 2 \quad 2x + 24y = 18 \\
 \underline{-2x - 6y = 0} \\
 18y = 18 \\
 y = 1 \\
 -2x - 6y = 0 \\
 -2x - 6(1) = 0 \\
 -2x - 6 = 0 \\
 -\frac{2}{-2}x = \frac{6}{-2} \\
 x = -3 \\
 (-3, 1)
 \end{array}$$

Example #5 - Getting a common coefficient

$$\begin{array}{r}
 2x + 4y = -8 \\
 -5x + 3y = 7
 \end{array}
 \quad
 \begin{array}{r}
 \textcircled{1} \times 5 \quad 10x + 20y = -40 \\
 \textcircled{2} \times 2 \quad \underline{-10x + 6y = 14} \\
 26y = -26 \\
 y = -1 \\
 2x + 4y = -8 \\
 2x + 4(-1) = -8 \\
 2x - 4 = -8 \\
 2x = -4 \\
 \frac{2}{2}x = \frac{-4}{2} \\
 x = -2 \\
 (-2, -1)
 \end{array}$$

PRACTICE PROBLEMS...

Worksheet - Solve by Elimination.pdf

Do #1 - 12

$$\begin{array}{r} \#3. \quad x - y = 11 \\ \quad 2x + y = 19 \\ \hline \quad 3x = 30 \\ \quad x = 10 \\ \\ \quad 2x + y = 19 \\ \quad 2(10) + y = 19 \\ \quad 20 + y = 19 \\ \quad y = -1 \\ \\ \quad (10, -1) \end{array}$$

Solutions...

Kuta Software - Infinite Algebra 1 Name _____

Solving Systems of Equations by Elimination Date _____ Period _____

Solve each system by elimination.

1) $-4x - 2y = -12$ $4x + 8y = -24$ $(6, -6)$	2) $4x + 8y = 20$ $-4x + 2y = -30$ $(7, -1)$
3) $x - y = 11$ $2x + y = 19$ $(10, -1)$	4) $-6x + 5y = 1$ $6x + 4y = -10$ $(-1, -1)$
5) $-2x - 9y = -25$ $-4x - 9y = -23$ $(-1, 3)$	6) $8x + y = -16$ $-3x + y = -5$ $(-1, -8)$
7) $-6x + 6y = 6$ $-6x + 3y = -12$ $(5, 6)$	8) $7x + 2y = 24$ $8x + 2y = 30$ $(6, -9)$
9) $5x + y = 9$ $10x - 7y = -18$ $(1, 4)$	10) $-4x + 9y = 9$ $x - 3y = -6$ $(9, 5)$
11) $-3x + 7y = -16$ $-9x + 5y = 16$ $(-4, -4)$	12) $-7x + y = -19$ $-2x + 3y = -19$ $(2, -5)$

-1-

$$\begin{aligned} 13) \quad & 16x - 10y = 10 \\ & -8x - 6y = 6 \end{aligned}$$

$(0, -1)$

$$\begin{aligned} 14) \quad & 8x + 14y = 4 \\ & -6x - 7y = -10 \end{aligned}$$

$(4, -2)$

$$\begin{aligned} 15) \quad & -4x - 15y = -17 \\ & -x + 5y = -13 \end{aligned}$$

$(8, -1)$

$$\begin{aligned} 16) \quad & -x - 7y = 14 \\ & -4x - 14y = 28 \end{aligned}$$

$(0, -2)$

$$\begin{aligned} 17) \quad & -7x - 8y = 9 \\ & -4x + 9y = -22 \end{aligned}$$

$(1, -2)$

$$\begin{aligned} 18) \quad & 5x + 4y = -30 \\ & 3x - 9y = -18 \end{aligned}$$

$(-6, 0)$

$$\begin{aligned} 19) \quad & -4x - 2y = 14 \\ & -10x + 7y = -25 \end{aligned}$$

$(-1, -8)$

$$\begin{aligned} 20) \quad & 3x - 2y = 2 \\ & 5x - 5y = 10 \end{aligned}$$

$(-2, -4)$

$$\begin{aligned} 21) \quad & 5x + 4y = -14 \\ & 3x + 6y = 6 \end{aligned}$$

$(-6, 4)$

$$\begin{aligned} 22) \quad & 2x + 8y = 6 \\ & -5x - 20y = -15 \end{aligned}$$

Infinite number of solutions

$$\begin{aligned} 23) \quad & -14 = -20y - 7x \\ & 10y + 4 = 2x \end{aligned}$$

$(2, 0)$

$$\begin{aligned} 24) \quad & 3 + 2x - y = 0 \\ & -3 - 7y = 10x \end{aligned}$$

$(-1, 1)$

Create your own worksheets like this one with **Infinite Algebra 1**. Free trial available at [KutaSoftware.com](https://www.KutaSoftware.com)

Attachments

Worksheet - Solve by Elimination.pdf