

Solving Systems of Equations in 2 unknowns

Example

Given the following system, solve for x and y if possible,
Use the elimination method

$$\begin{aligned} -3x + 5y &= 21 \\ 2x - 4y &= -16 \end{aligned}$$

We can either make the coefficients of x to be either the same or of opposite signs or we can make the coefficients of y to be either the same or of opposite signs.

I choose x to have opposite signs for its coefficients

$$\begin{aligned} 2(-3x + 5y) &= 2(21) \\ 3(2x - 4y) &= 3(-16) \end{aligned}$$

$$-6x + 10y = 42$$

$$6x - 12y = -48$$

$$-2y = -6$$

$$y = 3$$

Now we can substitute this value of y in either one of the equations to evaluate x . I choose the first equation

$$-3x + 5(3) = 21$$

$$-3x = 21 - 15 \Rightarrow -3x = 6$$

$$x = -2$$

Therefore, the 2 lines intersect at the point $(-2, 3)$.
In this case, we say the system is consistent