Accuplacer Study Modules

TOPIC: **Solving a System of Linear Equations**

Khan Academy Link: https://www.khanacademy.org/math/algebra-home/algebra-basics/core-algebra-systems/core-algebra-systems-tutorial/v/solving-linear-systems-by-graphing

Sample Problem:

Solve for x and y: $\begin{cases} 3x + 4y = 4 \\ x = 5y + 14 \end{cases}$

Important vocabulary
coefficient: the number being multiplied by a variable

There is more than one way to approach this problem. The method below will usually work:

Step 1: Make sure both equations are in standard form ($ax + by = c$). If one is not in standard form, manipulate it so that it is in standard form.

**** The main idea of this method is to get opposites in one of the variables and then add the equations to make that variable disappear (adding opposites always equals zero).****

Step 2: Check to see if you have opposites in either variable. **If you do, go directly to step 6.** If you don't, continue to step 3 in order to get opposites in the x variable.

Step 3: IF the coefficients for x are the same , but not opposite, multiply the second equation by -1 to make the coefficients opposite **then go to step 6**. If the coefficients for x are not the same, go to step 4.

Step 4: Multiply the entire first equation by the ***coefficient*** of x from the second equation

Step 5: Multiply the entire second equation by the coefficient of x from the first equation. **IF BOTH x COEFFICIENTS ARE THE SAME SIGN, USE THE OPPOSITE OF COEFFICIENT ONE IN THIS STEP SO THAT YOU END UP WITH OPPOSITE COEFFICIENTS IN YOUR X VARIABLES.**

Step 6: Add the equations. One of your variables should disappear because they should have opposite coefficients.

Step 7: Solve for the variable that is left over in the resulting equation.

Step 8: Substitute the value you get from solving in step 7 back into one of the original equations to solve for the other variable.

Step 9: Report your solution as an ordered pair if required.

Solve for x and y: $\begin{cases} 3x + 4y = 4 \\ x = 5y + 14 \end{cases}$

Solution:

$x = 5y + 14$
$-5y \quad -5y$
$x - 5y = 14$

Step 1: Get the 2nd equation into standard form by getting the 5y to the left.

Rewrite the system using the standard form version of the 2nd equation.

$\begin{cases} 3x + 4y = 4 \\ x - 5y = 14 \end{cases}$

Step 2: There are not opposites in either variable, so do step 3

Step 3: The coefficients of x are not the same, so do step 4.

$\begin{cases} 3x + 4y = 4 \\ x - 5y = 14 \end{cases}$

Steps 4 and 5: The coefficients of x are 3 for the first equation and 1 for the 2nd. (Remember if there is no coefficient in front of a variable, then the coefficient is 1)

$\begin{cases} -1(3x + 4y = 4) \\ 3(x - 5y = 14) \end{cases}$

Multiply the entire first equation by -1 and the entire 2nd equation by 3.

DISTRIBUTE THE MULTIPLICATION FOR BOTH EQUATIONS!

$\begin{cases} -3x - 4y = -4 \\ 3x - 15y = 42 \end{cases}$

Step 6: Add the equations

$-19y = 38$

Step 7: Solve for y

$\frac{-19y = 38}{-19 \quad -19}$

(divide both sides of the equation by -19)

$y = -2$

$x = 5y + 14$

Step 8: Substitute $y = -2$ into either equation and solve for x

$x = 5(-2) + 14$
$x = -10 + 14$
$x = 4$

Solution: (4,-2)

Step 9: Report your solution as an ordered pair if required.

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TOPIC: **Solving a System of Linear Equations**

Instructions: Solve each system.

1. $\begin{cases} 4x + 6y = 24 \\ 10x - 6y = 18 \end{cases}$	2. $\begin{cases} 4x - 3y = 5 \\ 4x + 2y = 10 \end{cases}$

3. $\begin{cases} 5x + 3y = 11 \\ 3x - y = 15 \end{cases}$	4. $\begin{cases} -3x + 5y = 4 \\ y = 2x + 5 \end{cases}$