**Solving Linear Systems by Elimination**

Solving by using Elimination is very similar to solving by using Substitution. In both cases we are trying to get one equation that has only one variable. We then solve for this variable and get the other variable.

To do this using Elimination, we are going to either add or subtract the two equations together to *“eliminate”* one of the equations.

**Example #1**



*Step 1:* Write the system of equations so that like terms are aligned. (This means line up the x’s and y’s underneath each other. In this example this is already done.)

*Step 2:* Eliminate one of the variables and solve for the other variable.

Notice that the y variable in each equation has a coefficient of 2. In the top equation the 2 is negative and in the bottom equation the 2 is positive. If we were to add these two equations together, the y-values would cancel each other out. The y-values would be *eliminated*.

x – 2y = –19

+ (5x + 2y = 1)\_\_

= 6x + 0 = –18 x = \_\_\_\_\_\_\_\_\_\_\_

*Step 3:* Substitute the value of the variable into one of the original equations and solve for the other variable.

*Step 4:* Write your x and y answer as a coordinate point. (x, y)

Final Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Come show me your answer so I know you’re on the right track!

**Example #2**



Step 1: Are the like terms aligned? Yes or No? \_\_\_\_\_\_\_\_\_\_\_\_

Step 2: Eliminate one of the variables and solve for the other.

Now with this example we should notice that it looks like we can cancel the y-values since they both have a coefficient of 4. However both of the coefficients are positive! Therefore instead of *adding* these two equations together, in order to eliminate the y-values we will have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the two equations.

3x + 4y = 18

– (–2x + 4y = 8)\_\_

= x = \_\_\_\_\_\_\_\_\_\_\_

Step 3: Substitute the value of the variable into one of the original equations and solve for the other variable.

Step 4: Write your x and y answer as a coordinate point.

Final Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Come show me your answer or check with a neighbor to see if you’re correct!

**Example #3**



Step 1: Are the like terms aligned? Yes or No? \_\_\_\_\_\_\_\_\_\_\_\_

Step 2: Eliminate one of the variables and solve for the other.

Here is where we start to run into some trouble. Notice that neither the x nor the y coefficients are the same. How are we going to eliminate them then!?

Calm down. We need to first manipulate one of the equations so that we are able to cancel them. Let’s multiply everything in the bottom equation by 2.

2 (–x + 3y = –12) =

Now our system of linear equations looks like this:



Notice now that we can cancel the x-values by adding the two equations together. Now this will look exactly like the first example problem. Finish it up.

2x + y = 3

+ (–2x + 6y = –24)\_\_

= y = \_\_\_\_\_\_\_\_\_\_\_

Step 3: Substitute the value of the variable into one of the original equations and solve for the other variable.

Step 4: Write your x and y answer as a coordinate point.

Final Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Come show me your answer so I know you’re on the right track!

**Assignment:** Practice B WS + pg 401 #1-10