

Magic Technique for Systems of Linear Equations

Concept

When you solve a system of linear equations, one method you can use is the “elimination” method. Using the elimination method, you can solve for both variables by lining up the variables and constants and eliminating a variable.

There is also a magic technique we can use to solve a system of linear equations. All we need to do is replace one of the equations using this magic technique. What is the magic technique you ask?

How to Use the Magic Technique

Step 1: Set the first equation aside for later.

Step 2: Multiply each term in the 2nd equation by any factor. This factor can be your choice (2, 8, 99, -4 etc..).

Step 3: Add the first equation and the new 2nd equation.

Step 4: Use the elimination method to solve the system of equations.

Example Problem

Equation 1: $4x - 2y = 8$ **Equation 2:** $2x + y = 6$

In **step 1**, we will set the first equation aside for later. For **step 2**, let's multiply the second equation by a factor of 2, giving us $4x + 2y = 12$. For **step 3**, we then add this new equation to the first equation, giving us $8x - y = 20$. We now have our two equations for step 4 using our magic technique: **$8x - y = 20$** and **$4x - 2y = 8$**

In **step 4**, we will solve these equations using the elimination method. To do this we will multiply our magic equation by 1 and our original equation by 2 giving us:

$$8x - y = 20$$

$$8x - 4y = 16 \text{ Adding these together, we get } -5y = 36 \text{ or } y = 7.2$$

Since we now know that $y = 7.2$, we can solve equation 2. This looks like $2x + 7.2 = 6$, which simplifies to $2x = -1.2$, and then gives us $x = -0.6$. We have now used our magic technique to solve for the system of equations.

Assignment

Directions

Answer the questions below using the following equations:

Equation 1: $3x + 4y = 10$

Equation 2: $2x - 2y = 8$

Questions

Question 1: Use the elimination method to solve the system of equations.

Question 2: Using the magic technique, create a new equation following steps 1, 2, and 3.

Question 3: Use the elimination method to solve the system of equations using the equation you created with the magic technique.

Question 4: Explain why you think this magic technique works to solve the system of equations.

Student Activity

Traits	1- Poor	2- Partial	3- Acceptable	4- Excellent
<u>Methods/ Steps</u>	Does not use any methods or used the wrong steps	Used the correct method, but the answer was incorrect	Used the correct method and steps to find the correct answer	Used the correct method and steps in the best manner to solve the equations
<u>Math Skills</u>	Did not use any math skills to solve the problems	Used the correct skills but did not answer correctly	Used the correct skills to solve the problem correctly	Applied all skills of the lesson to correctly answer the problems
<u>Math Terms and Symbols</u>	Math terms and symbols are not used or used incorrectly	Math terms and symbols are used correctly in most cases.	Math terms and symbols were used appropriately to solve the problems	All math symbols and terms were used correctly and organized throughout the problem solving.
<u>Organization</u>	Work is not organized	Work is organized partially	Work is organized and readable	Work is well organized and easy to read
<u>Explanation</u>	Explanation does not make sense	Explanation shows some understanding	Explanation shows understanding of the concepts	Explanation shows a thorough understanding of the concepts