System of Linear Equations

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Name: Courtney Bruyea

Grade level(s): 10, 11, and 12  Special Education & Math

Objectives:
Students will solve systems of equations by graphing. Through using the graphing calculator students will be able to visually see how linear equations cross to create a solution to a system of equations. The students will also learn how to trace and calculate the solution to the system using the graphing calculator as well.

Procedure:
Students will use mathematical modeling to represent a system of linear equations and their solution. Students will use the graphing calculator to interpret a system of linear equations by graphing them. They will then calculate the solution to the system of equations by using the calc. application within the graphing calculator functions.
Lesson Description:

Using the graphing calculator, I plan on having my students graph a system of linear equations. I will start the lesson by asking my students if they remember how to graph a line. Once we have reviewed how to graph a line using the calculator I will then introduce the topic of solving systems of equations.

I will begin the activity by writing two equations on the board that I will have my students write down in their notebooks. (\( y = -3x + 2 \), and \( y = 2x - 5 \)). I will then ask them to go to their calculators and press the \( y= \) button and clear any old equations by pressing clear. Then as I am entering the equations on my calculator I will have my students enter their equations into their calculators. The students will enter the first equation in the \( y_1 \) spot and then press the down arrow key and enter the second equation in the \( y_2 \) spot. I will circulate around the room to assure that the students know and understand how to accomplish this task.

Next I will instruct the students to view their graph by pressing the Zoom 6 button. Then they will press the Trace button and the > button six times to move the cursor to the intersection of the two lines. I will be modeling this on the overhead while my students are completing this task. I will check for understanding by asking my students if they have accomplished this task. Once completed I will move on to the next step.

Next, we will find the point of intersection of the two equations by pressing 2\(^{nd}\) [Calc] 5. The calculator will then ask you to select the first two intersecting curves. Since \( Y_1 \) is already selected, press enter. The calculator will now ask for the second intersecting curve. Since \( Y_2 \) is selected, press enter. Now the calculator will ask you to guess the intersection by selecting a nearby point with the cursor. The cursor is already at the intersection, so press enter.
The intersection is at (1.4, -2.2). As seen in the picture below.

I would then circulate around the room to see how my students were doing and if they had any questions. I would then give them other examples to work on by themselves while I walked around to check to see if they understand how to solve a system of equations graphically. I would require the students to complete the examples according to the requirements stated in the rubric below.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematical Concepts</td>
<td>Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).</td>
<td>Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).</td>
<td>Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).</td>
<td>Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.</td>
</tr>
<tr>
<td>Use of Calculator</td>
<td>Student always listens and follows directions and only uses calculator as instructed.</td>
<td>Student typically listens and follows directions and uses calculator as instructed most of the time.</td>
<td>Student sometimes listens and follows directions and uses calculator appropriately when reminded.</td>
<td>Student rarely listens and often &quot;plays&quot; with the calculator instead of using them as instructed.</td>
</tr>
<tr>
<td>Completion</td>
<td>All problems are completed.</td>
<td>All but 1 of the problems are completed.</td>
<td>All but 2 of the problems are completed.</td>
<td>Several of the problems are not completed.</td>
</tr>
</tbody>
</table>