Introduction to Solving Systems

Grade Level and Content

8th Grade Algebra

Big Idea

First, students will take a pretest to determine the extent of their knowledge with respect to solving systems of linear equations and inequalities. Second, students will use a calculator to explore what happens at the point where two lines intersect. They will discover that a solution of a system of linear equations is an ordered pair that makes both equations true. Students will also relate the two vocabulary terms for this section to the system they graphed on the calculator.

Objectives

Students will be able to …

1. Correctly demonstrate that the solution of a system of linear equations is the point of intersection 8 out of 10 times.

PA State Standards

Anchor Descriptor - A1.1.2.2: Write, solve and/or graph systems of linear equations using various methods.

A1.1.2.2.1: Write and/or solve a system of linear equations (including problem situations) using graphing, substitution and/or elimination (limit systems to 2 linear equations).

Rationale for Students

Students enjoy using the calculator so this activity will get them excited about the chapter. This activity will also help students to understand what the solution of a system means, i.e. they will understand that the ordered pair that makes both equations true is the solution of the system. All of this will help them learn the material in the chapter, which is required by the standards. The vocabulary newsletter will lay a conceptual foundation for why they are learning this material.

Materials

- 22 copies each: Pretest, Vocabulary Newsletter (p. 1)
- 1 promethean board with computer and TI SmartView TI-84 Plus
- Graphics Calculators

Adaptations for Special Needs

No specific adaptations were recommended by the special education teacher. All students took the same pretest and participated in the exploration. The exploration enabled students to visualize what the solution of a system of linear equations is. Students who are visual learners benefited from this approach.

Technology

The promethean board and calculator software will be used to present the lesson and enables the teacher and the students to work out solutions together. Students will each have access to a calculator to work through while one student is at the board.

Pretest — 20 minutes, 20minutes

Introduce the pretest. Make sure students know they will not be graded on this.

Anticipatory Set — 5 minutes, 25 minutes

Write down some ideas in response to this question. Hold on to it until the end.

Is it possible to be on two different roads at the same time?

Procedure — 15 minutes, 40 minutes

Based on Exploration 6-1 Solving Systems by Graphing (Holt Algebra 1, p 40)

Talk students through the exploration with the calculator displayed on the promethean board.

You have solved linear equations before. Now you will more than one simultaneously.

Choose a student to use the promethean calculator.

Equations: $y = 2x - 5$; $y = -x + 4$

1. **[Y=] Enter the equations on the calculator but do not graph them yet.**
2. **[2nd][TABLE] View the table and look at the x- and y-values first. Find an x-value that produces the same y-value for both equations. Write this down.**
3. **With what you know about slope, how do you think these lines will appear on the graph? Are they parallel? Will they intersect? What do you think is happening at point (3,1)?**
4. **Scroll up and down to see if there are any more x-values that produce the same y-value for both equations.**
5. **[WINDOW] Set the min and max values: Xmin=(–10); Xmax=(10); Ymin=(–10); Ymax=(10).**
6. **[GRAPH] Graph the equations.**

Think and Discuss

1. **Describe this graph. What is happening here?**
2. **Use CALC to display the point of intersection.**
   a. **[2nd] [CALC][5][ENTER] to select 5:Intersect from the Calculate menu.**
   b. **First curve? [ENTER] Second curve? [ENTER] Guess? [ENTER] (we only have two functions and one intersection point so we can just press [ENTER] without specifying the curves and int. pt.**
3. **What is the intersection point?**
4. **How does this point compare to the point you wrote down earlier where the x-value resulted in the same y-value for both equations.** *(same)*
5. **What is happening at point (3, 1)?** *(the lines intersect)*

So we have a group of equations and a point that is a solution to both equations. Tonight you will work on your vocabulary for this chapter. Let's look at the first two words now.

1. Choose a student to read the vocabulary terms.
2. **What do we call the two equations that we graphed together on the calculator?** *(system of linear equations)*
3. **What was point (3, 1) with respect to our system?** *(the solution to the system)*
4. **What makes this point the solution to the system?** *(it is the ordered pair that makes both equations true or that satisfies both equations)*

Closing — 5 minute, 45 minutes

Discuss the anticipatory set question: **Is it possible to be on two different roads at the same time?**

Respond to the following using complete sentences and at least 5 lines.

- How is the solution of a system of linear equations similar to being on two different roads at the same time?

Students write their responses and hand them in as an exit slip.

Homework

Vocabulary Newsletter