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Lesson 1.08 Systems of Linear Equations (3x3)

Students will be able to:

- **Content Objective:** Solve a system of three linear equations algebraically and using matrices.

- **Language Objective:** Explain what happens when a system of three equations has no solution.

Warm Up

Solve the linear system below algebraically using the method of elimination.

$$4x - 3y = 10$$
$$3x + 5y = -7$$

Vocabulary Review

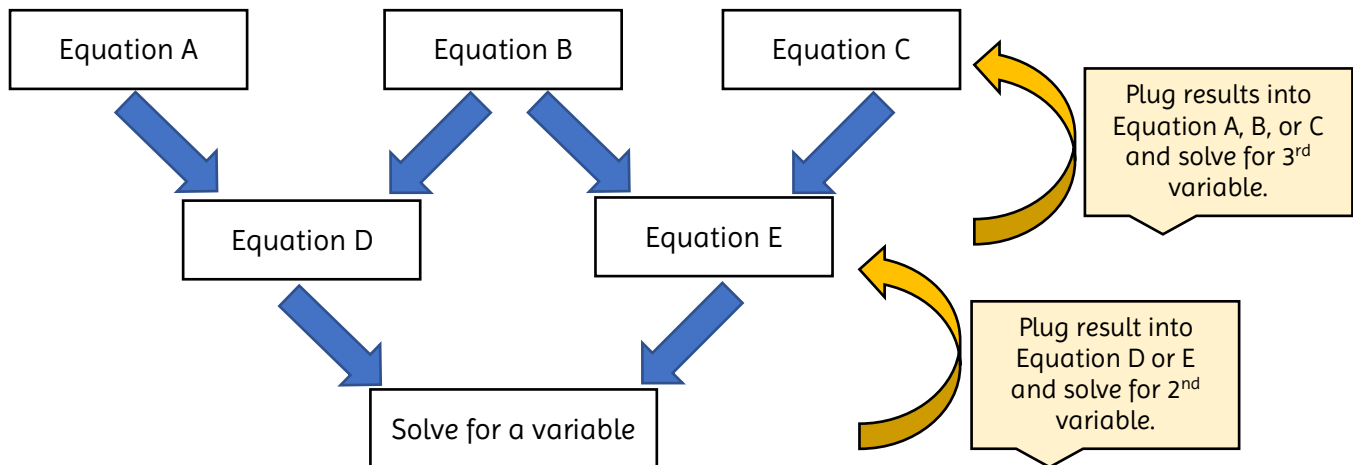| System of Equations	
A set of _____ or more equations that share variables.	**Example:** $3x + 2y - z = 4$ $4x - y + z = 9$ $x - y + z = 3$

Graphic Organizer

Solving a System of 3 Equations with 3 Variables

Equation A	Equation B	Equation C

Plug results into Equation A, B, or C and solve for 3rd variable.

Equation D	Equation E

Plug result into Equation D or E and solve for 2nd variable.

Solve for a variable

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Skill 1: Solving a System of 3 Equations with 3 Variables (Algebraically)

Solve the system of equations below algebraically.

$$4x - 5y + 4z = 19$$
$$-x - 5y - 5z = 2$$
$$x + 5y - z = -20$$

Exercise 1: Solving a System of 3 Equations with 3 Variables (Algebraically)

Solve the system of equations below algebraically.

$$4x - 4y + 4z = -4$$
$$4x + y - 2z = 5$$
$$-3x - 3y - 4z = -16$$

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There is a way to check our answers to Skill 1 and Exercise 1 using matrices and our graphing calculators.

<u>Matrix:</u> a rectangular array or table of numbers, symbols, or expressions, arranged in rows and columns, used to represent a mathematical object such as an equation or other subcategory.

Example:

$$A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \end{bmatrix}$$

2×3 matrix

Skill 2: Solving a System of 3 Equations with 3 Variables (Matrices)

Solve the system of equations below using matrices and the graphing calculator.

$2x - y + 4z = -3$
$x - 2y - 10z = -6$
$3x + 4z = 7$

Exercise 2: Solving a System of 3 Equations with 3 Variables (Matrices)

Solve the system of equations below using matrices and the graphing calculator.

$-5q + 3r + 6s = 4$
$-3q + r + 5s = -5$
$-4q + 2r + s = 13$

Write It Out

Solve the system below algebraically. What do you notice?

$$5a + 5b + 5c = -20$$
$$4a + 3b + 3c = -6$$
$$-4a + 3b + 3c = 9$$

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1.08 Problem Set

Name:_____

1. Solve the system of equations below algebraically.

$$x - 6y + 4z = -12$$
$$x + y - 4z = 12$$
$$2x + 2y + 5z = -15$$

2. Solve the system of equations below using matrices.

$$x - y - 2z = -6$$
$$3x + 2y = -25$$
$$-4x + y - z = 12$$