**Unit 4 - Systems of Equations**

Lesson 1: Solving a system of linear equations graphically.
Objective: Today we will solve a system of linear equations graphically.
Standard: 8.EE.8a

**Graphically**

1. Identify the \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ for the first equation.
2. Graph and \_\_\_\_\_\_\_ the first equation.
3. Identify the \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ for the second equation.
4. Graph and \_\_\_\_\_\_\_ the second equation.
5. Write the point of intersection as an ordered pair to represent the \_\_\_\_\_\_\_\_\_\_.

**Example:**

Solve the following system of equations graphically.

$y=x+2$ $y=2x+1$

Lesson 2: Solving a system of linear equations graphically when one or both equations are not given in slope-intercept form.
Objective: Today we will solve a system of linear equations graphically.
Standard: 8.EE.8a

**Graphically**

1. Make sure both equations are in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Identify the \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for the first equation.
3. Graph and \_\_\_\_\_\_\_ the first equation.
4. Repeat for the second equation.
5. Write the point of intersection as an ordered pair to represent the \_\_\_\_\_\_\_\_\_\_\_.

**Example:**

Solve the following system of linear equations graphically.

$3x+4y=12$ $y=-\frac{3}{4}x+3$

Lesson 3: Solving a system of linear equations using substitution.
Objective: Today we will solve a system of linear equations algebraically.
Standard: 8.EE.8b

**Substitution**

1. Make sure both equations are $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$
2. Since $y=y$ set both equations \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ each other
3. Solve the equation
4. Solve for the other variable by substituting the known variable
5. Write the answer as an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. \_\_\_\_\_\_\_ the solution in both equations

**Example:**

Solve the following system of linear equations algebraically.

$$y=-x+8$$

$$y=3x$$

Lesson 4: Solving a system of linear equations using substitution.
Objective: Today we will solve a system of linear equations algebraically.
Standard: 8.EE.8b

**Substitution – Day 2**

1. Make sure both equations are $y=$
2. Since $y=y$ set both equations equal to each other
3. Solve the equation
4. Solve for the other variable by substituting the known variable
5. Write the answer as an ordered pair
6. Check the solution in both equations

**Example:**

Solve the following system of linear equations algebraically.

$$y=-x+4$$

$$2x-2y=10$$

Lesson 5: Solving a system of linear equations using elimination.
Objective: Today we will solve a system of linear equations algebraically.
Standard: 8.EE.8b

**Elimination (Addition)**

**The Addition Method (Elimination):**

1. Make sure the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are lined up.
2. \_\_\_\_\_ the equations to eliminate one of the variables.
3. Solve the resulting equation.
4. \_\_\_\_\_\_\_\_\_\_\_\_ your answer into ONE of the equations.
5. Solve for the second variable.
6. Write your answer as an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. Check the solution in both equations.

**Example:**

Solve the following system of equations algebraically.

 $5x-4y=-21$

$$-2x+4y=18$$

Lesson 6: Solving a system of linear equations using elimination.
Objective: Today we will solve a system of linear equations algebraically.
Standard: 8.EE.8b

**Elimination (Multiplication)**

Sometimes variables will not have opposite coefficients to eliminate nicely.

IF this happens, you will need to:

1. Make sure the like variables are lined up.
2. \_\_\_\_\_\_\_\_\_\_ each equation by the coefficient in the other equation.

\*\*You may need to change the sign of one of the coefficients.

1. \_\_\_\_\_ the equations together to eliminate a variable.
2. Solve the resulting equation.
3. \_\_\_\_\_\_\_\_\_\_\_\_ your answer into ONE of the equations.
4. Solve for the second variable.
5. Write your answer as an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Check the solution in both equations.

**Example:**Solve the system of linear equations algebraically.

$$7x+2y=5$$

$$2x+3y=16$$

Lesson 7: Understanding Types of Solutions.
Objective: Today we will identify the number of solutions for a given system of linear equations.
Standard: 8.EE.8a

Each system of equations can have one of three types of solutions:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Rule:**

How do you know how many solutions?

One solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

No Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Infinite Solutions: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lesson 8: Understanding Solutions to Systems of Linear Equations.
Objective: Today we will explain solutions to systems of linear equations.
Standard: 8.EE.8a

How can we determine if a given point is a solution to a system of linear equations?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is the point $(4, 3)$ a solution to the lines $x+y=7$ and $x-y=1$? Justify your answer.

What do you think the graph of the above lines looks like? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lesson 9: Word Problems.
Objective: Today we will solve real-life word problems involving systems of linear equations.
Standard: 8.EE.8c

1. Write a \_\_\_\_\_ statement to define what $x$ and $y$ stand for
2. Write two equations to represent the situation
3. Solve for one variable
4. Solve for the other variable by substituting the known variable
5. Write the answer
6. Check your solution

**Examples:**

1. The sum of two numbers is 18. Two times the larger plus three times the smaller equals 27. Find the numbers.
2. A warehouse stacks 3 large boxes and two small boxes to a height of 11 feet. It also stacks two large boxes and 1 small box to a height of 7 feet. What are the heights of the large and small box?