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BASIC 7

WEEKLY LESSON PLAN – WEEK 3

Strand:	Algebra	**Sub-Strand:**	Equations and Inequalities		
Content Standard:	B7.2.3.1 Demonstrate an understanding of linear equations of the form x + a = b (where a and b are integers) by modelling problems as a linear equation and solving the problems concretely, pictorially, and symbolically				
Indicator (s)	B7.2.3.1.3 Model linear equations, then write mathematical expression and describe the process of solving the equation. B7.2.3.1.4 Solve linear equations in one variable	**Performance Indicator:** Learners can solve Linear equations by graphing, elimination and substitution methods.			
Week Ending	14-07-2023				
Class	B.S.7	**Class Size:**		**Duration:**	
Subject	Mathematics				
Reference	Mathematics Curriculum, Teachers Resource Pack, Learners Resource Pack, Textbook.				
Teaching / Learning Resources	Charts, Poster, Pictures.	**Core Competencies:**	• Analyze and make distinct judgment about viewpoints expressed in an argument		

DAYS	**PHASE 1 : STARTER**	**PHASE 2: MAIN**	**PHASE 3: REFLECTION**
MONDAY	Discuss the mathematical model for a linear equation with the Learners.	1. Assist Learners to describe the various methods of solving linear equation. 2. Demonstrate on how to write an equation that models a linear relationship. 3. Learners brainstorm to identify the steps to write linear equations. **Mathematical Model;** Mathematical modeling is the process of using various mathematical structures – graphs, equations, diagrams, scatterplots, tree diagrams, and so forth – to represent real world situations. The model provides an abstraction that reduces a problem to its essential characteristics. **Examples of Linear Equations;** 3x + 4y - 7z = 2, -2x + y - z = -6, x - 17z = 4, 4y = 0, and x + y + z = 2 **Ways of Writing a Linear Equation;**	Through questions and answers, conclude the lesson. **Exercise;** 1. What is Mathematical Model? 2. Stat 3 ways of writing a Linear equation.

		• point-slope form • standard form • slope-intercept form. **ways to solve systems of linear equations in two variables:** 1. graphing. 2. substitution method. 3. elimination method.	
TUESDAY	Demonstrate on how to solve a linear equation by graphing.	1. Assist Learners to solve examples of linear equations by graphing. 2. Discuss with Learners on how to solve systems of equations by graphing and substitution 3. Assist learners to distinguish between the substitution method and the elimination method Example; Solve the system by graphing: {y=12x−3x−2y=4} $\begin{cases} y=\frac{1}{2}x-3 \\ x-2y=4 \end{cases}$ To graph the first equation, we will use its slope and *y*-intercept $y=\frac{1}{2}x-3$ $m=\frac{1}{2}$ $b=-3$ To graph the second equation, we will use the intercepts. $x-2y=4$ | x	y
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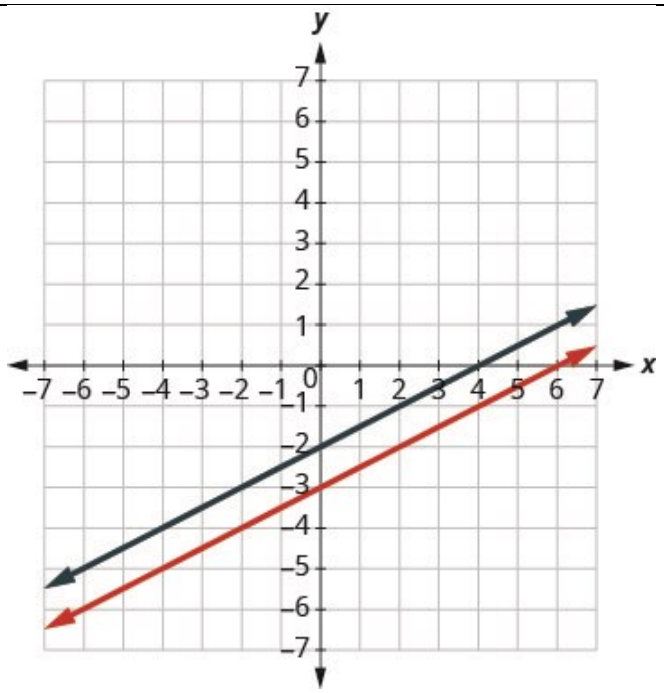
0	−2
4	0		**Exercise;** 1. Determine whether the ordered pair is a solution to the system: {x−y=−12x−y=−5 i. (−2,−1) ii. (−4,−3) 2. Determine whether the ordered pair is a solution to the system: {3x+y=0x+2y=−5 i. (1,−3) ii. (0,0) 3. Solve the system by graphing: {2x+y=7x−2y=6



Solve a System of Equations by Elimination

The Elimination Method is based on the Addition Property of Equality. The Addition Property of Equality says that when you add the same quantity to both sides of an equation, you still have equality. We will extend the Addition Property of Equality to say that when you add equal quantities to both sides of an equation, the results are equal.

For any expressions *a*, *b*, *c*, and *d*,
To solve a system of equations by elimination, we start with both equations in standard form. Then we decide which variable will be easiest to eliminate. How do we decide? We want to have the coefficients of one variable be opposites, so that we can add the equations together and eliminate that variable.

Notice how that works when we add these two equations together:

The *y*'s add to zero and we have one equation with one variable.
Let's try another one:
This time we don't see a variable that can be immediately eliminated if we add the equations.

But if we multiply the first equation by −2, we will make the coefficients of *x* opposites. We must multiply every term on both sides of the equation by −2.

$$\begin{cases} -2(x+4y) = -2(2) \\ 2x+5y = -2 \end{cases}$$

$$\begin{cases} -2x-8y = -4 \\ 2x+5y = -2 \end{cases}$$

Now we see that the coefficients of the *x* terms are opposites, so *x* will be eliminated when we add these two equations.

Add the equations yourself—the result should be $-3y = -6$. And that looks easy to solve, doesn't it? Here is what it would look like.

$$\begin{array}{r} -2x-8y=-4 \\ 2x+5y=-2 \\ \hline -3y=-6 \end{array}$$

We'll do one more:

It doesn't appear that we can get the coefficients of one variable to be opposites by multiplying one of the equations by a constant, unless we use fractions. So instead, we'll have to multiply both equations by a constant.

We can make the coefficients of *x* be opposites if we multiply the first equation by 3 and the second by −4, so we get $12x$ and $-12x$.

$$3(4x-3y) = 3(10)$$

$$-4(3x+5y) = -4(-7)$$

This gives us these two new equations:

When we add these equations,

the *x*'s are eliminated and we just have $-29y = 58$.

Once we get an equation with just one variable, we solve it. Then we substitute that value into one of the original equations to solve for the remaining variable. And, as always, we check our answer to make sure it is a solution to both of the original equations.

Now we'll see how to use elimination to solve the same system of equations we solved by graphing and by substitution.

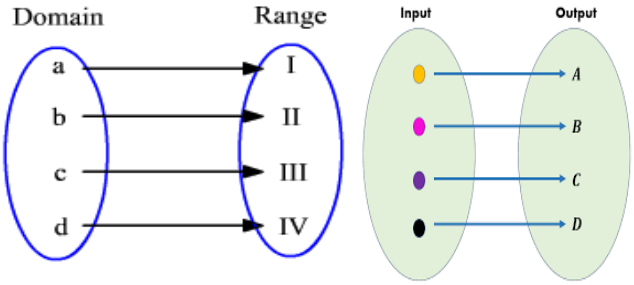
EXAMPLE

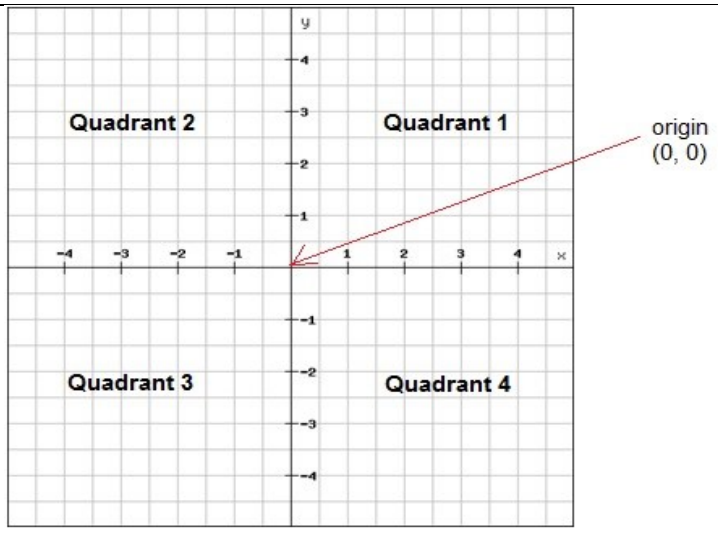
How to Solve a System of Equations by Elimination

Solve the system by elimination.

Solution

Step 1. Write both equations in standard form. If any coefficients are fractions, clear them.	Both equations are in standard form, $Ax + By = C$. There are no fractions.	$\begin{cases} 2x + y = 7 \\ x - 2y = 6 \end{cases}$
Step 2. Make the coefficients of one variable opposites. Decide which variable you will eliminate. Multiply one or both equations so that the coefficients of that variable are opposites.	We can eliminate the y's by multiplying the first equation by 2. Multiply both sides of $2x + y = 7$ by 2.	$\begin{cases} 2x + y = 7 \\ x - 2y = 6 \end{cases}$ $\begin{cases} 2(2x + y) = 2(7) \\ x - 2y = 6 \end{cases}$
Step 3. Add the equations resulting from Step 2 to eliminate one variable.	We add the x's, y's, and constants.	$\begin{cases} 4x + 2y = 14 \\ x - 2y = 6 \end{cases}$ $5x \quad = 20$
Step 4. Solve for the remaining variable.	Solve for x.	$x = 4$
Step 5. Substitute the solution from Step 4 into one of the original equations. Then solve for the other variable.	Substitute $x = 4$ into the second equation, $x - 2y = 6$. Then solve for y.	$x - 2y = 6$ $4 - 2y = 6$ $-2y = 2$ $y = -1$

		<table><tr><td>**Step 6.** Write the solution as an ordered pair.</td><td>Write it as (x, y).</td><td>$(4, -1)$</td></tr><tr><td>**Step 7.** Check that the ordered pair is a solution to **both** original equations.</td><td>Substitute $(4, -1)$ into $2x + y = 7$ and $x - 2y = 6$ Do they make both equations true? Yes!</td><td>$2x + y = 7$ $\quad$ $x - 2y = 6$ $2(4) + (-1) \stackrel{?}{=} 7$ $\quad$ $4 - 2(-1) \stackrel{?}{=} 6$ $7 = 7$ ✓ $\quad$ $6 = 6$ ✓ The solution is $(4, -1)$.</td></tr></table>	
THURSDAY **20-04-2023**	Discuss the meaning of "Mapping" with the Learners.	1. Assist Learners to identify steps to follow to draw a table for the mapping defined by rules on a domain. 2. Demonstrate on to how to locate points on a number plane. 3. Individual Learners to practice locating points on a number plane. 4. Assist Learners to draw graph for given relations. **Creating a Mapping Diagram;** ○ To create a mapping diagram ○ draw two circles and label the first as the inputs and the second as the outputs (or whatever these are in the scenario). ○ Then, draw an arrow from one input value to its matching output value ○ continue until all input, output values are matched  **Locating Points on a coordinate plane;** ❖ To identify the x-coordinate of a point on a graph, read the number on the x-axis directly above or below the point. ❖ To identify the y-coordinate of a point, read the number on the y-axis directly to the left or right of the point. ❖ Remember, to write the ordered pair using the correct order (x,y) .	Learners brainstorm to use knowledge of identifying and plotting points in a number plane to solve problems. **Exercise;** Draw the following ordered pairs in the coordinate plane (0, 0); (0,4); (4, -2); (-2, -4); (1, 3)

Name of Teacher: ***School:*** ***District:***