Concept: Solving Linear Systems

Name:

COMPUTER COMPONENT

<u>Instructions</u>: In UMATH X follow the **Content Menu** path:

Equations > **Solving Linear Systems**

Work through all Sub Lessons of the following Lessons **in order**:

- *In This Topic*
- *The Meaning of a Linear System*
- *Solve a Linear System by Graphing*
- *Solve a Linear System by Substitution*
- *Solve a Linear System by Elimination*

<u>Additional Required Materials</u>: Pencil Crayons

NOTE: You will not be finishing the entire section before stopping to complete some **OFF COMPUTER EXERCISES**.

As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

When you reach the end of the lesson *Solve a Linear System by Elimination* on the computer, move on to the **OFF COMPUTER EXERCISES** below**.**

NOTES:

Remember from Understanding Graphing, Linear Relations, What is a Linear Relation?

- A ____________________ can be represented by a ____________________ equation.
- A ___________________ equation is of the form _____ + ______ + ____ = _______

  Where ____ , _____, and _____ represent _________ numbers.

- _____ = _____ + _____ is the equation of a ______________________ line.

- For an equation of a straight line we can graph it by two methods:

  Example: $y = 3x + 2$

  - Method 1:

    Pick ________ points on the ____________ by picking some

    values for __________ and finding the corresponding value for _____.

    Then:

    Graph the points.

  - Method 2:

    Determine

    - Slope (m) = ______
    - y-intercept (b) = _______
    - Then graph the y-intercept
    - Use the slop to find another point on the line with

      _________________ coordinates.

Summary:

_____ + _____ + _____ = ______ or _____ = ______ + ______

is a __________________ equation.

A _________ of _________________ equations, considered __________________, is a

_________________________ _______________________.

- When we _________________ a ___________________ ________________

  we find the point of ______________________________.

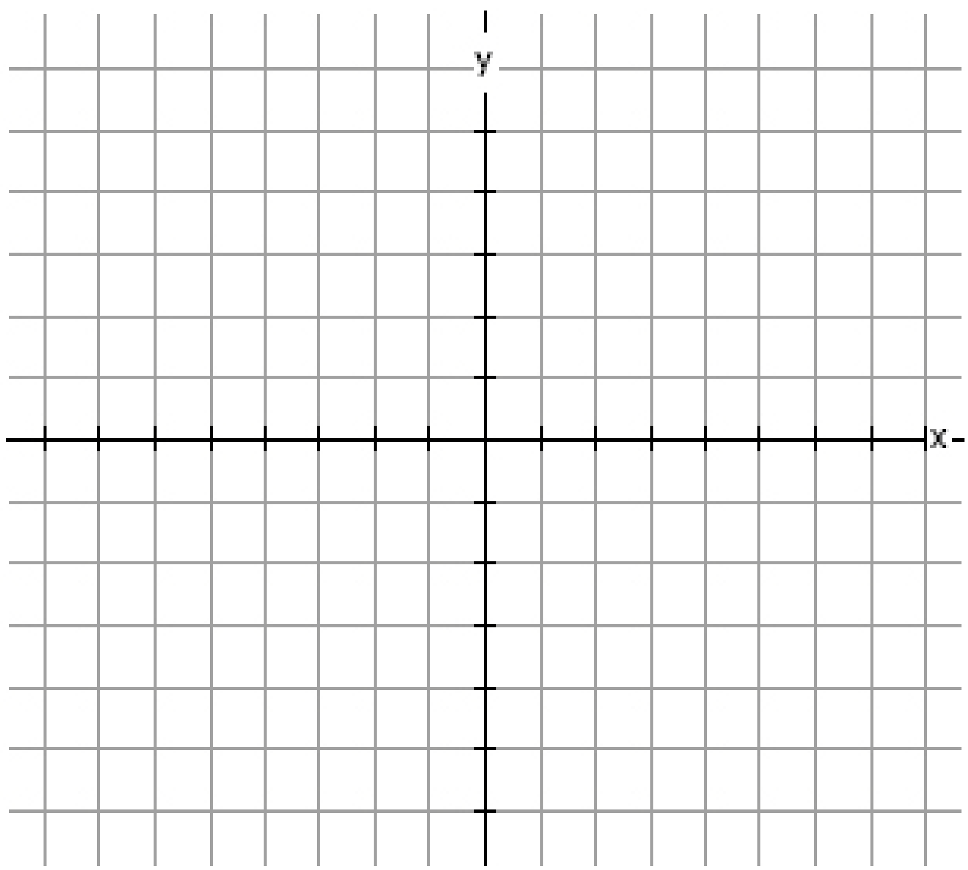
Solve a Linear System by Graphing

- We use the graphs of ________________ lines to __________________ the

  point of ___________________________ for the ______________ lines.

Solve:

Equation	y-intercept	Slope	Another Integer Coordinate
$y = 2x + 3$	(0, ______)		(_____, _____)
$y = x - 1$	(0, ______)		(_____, _____)



- Graph the coordinate points.
- Find the point where the ____ lines seem to ____________.
- x = _______

  y = _______

  (____, ____)

This point is called the _____________ of the system of linear equations.

After looking at Solving a Linear Systems by Graphing:

1. Equations having slopes that are negative.
2. Equations having slopes that include fractions (*rise over run*).
3. Equations having slopes that are the same (*parallel lines*).
4. Equations having slopes that are the same (*coincidental lines*).

Determine similarities and differences and explain why. (*Use examples to help clarify your ideas*.)

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Solving a Linear System by Substitution

Solve:

$$\begin{aligned} 2x - y + 3 &= 0 \\ x - y - 1 &= 0 \end{aligned}$$

Steps:

Step	Example
1. Select _______ of the ____________________ and ______________________ the _______________________.	$2x - y + 3 = 0$ (1) $x - y - 1 = 0$ (2) Choose equation (1) y = _____ + ______
2. _____________________ this expression into the other ________________________ (2)	x – y - 1 = 0 (2) x – (____ + ____) - 1 = 0

3. **Solve for the _______________ variable.**	**x – (____ + ____) - 1 = 0** **x = _______**
4. **_____________________ this value (x = ___)** **into the ________________________ equation** **to solve for _____.**	**2 x – y + 3 = 0 (1)** **2 (______) – y + 3 = 0 (1)** **_____ = y** **Common point is (_____, ______)**

5.
 	
Check:____________ the solution into each
 	
____________________ equation.
	2 x – y + 3 = 0 (1)
	
	x – y - 1 = 0 (2)
	
	For (1)
	
	L.S. = 2 x – y + 3
	
	= 2 (___) - (____) + 3
	
	= ______
	
	R.S. = 0 ← Same, L.S. = R.S.
	
	For (2)
	
	L.S. = x – y - 1
	
	= (___) - (____) - 1
	
	= ______
	
	R.S. = 0 ← Same, L.S. = R.S.

After looking at Solving a Linear Systems by Substitution:

1. Intersecting Lines.
2. Intersecting Lines Involving Fractions
3. Parallel Lines
4. Coincidental Lines.

Determine similarities and differences and explain why. (*Use examples to help clarify your ideas*.)

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Solving Linear Systems by Elimination

Step	Example
1. ____________________ the equations so that ________, ________, and ________________ terms are _______________ each other.	$2x - y + 3 = 0$ (1) $x - y - 1 = 0$ (2) $2x - y =$ ______ (1) $x - y =$ ______ (2)

2. If ____________________ _________________ each __________________ by a _____________ so that the _____________ or ____________ terms ____________ to ______.	2 x – y = ______ (2) × - 1 x + (____) y = ______
3. _____________ the equations to solve for ____________ of the __________________.	2 x – y = ______ ____ x + ____ y = ______ ――――――――――――― ____ x + ____ y = ______
4. _______________________ for (______).	____ **x** = ______
5. ______________________ for the ____________ into __________ equation and ___________ for the ___________________.	x – y - 1 = 0 (_____) – y - 1 = 0 _____ = y Common point is (_____, ______)

6.
 	
____________ the solution in each
 	
____________________ equation.
	$2x - y + 3 = 0$ (1)
	
	$x - y - 1 = 0$ (2)
	
	The common point is (______, ______)
	
	For (1)
	
	L.S. = $2x - y + 3$
	
	= 2 (___) - (____) + 3
	
	= ______
	
	R.S. = 0 ← Same, L.S. = R.S.
	
	For (2)
	
	L.S. = $x - y - 1$
	
	= (___) - (____) - 1
	
	= ______
	
	R.S. = 0 ← Same, L.S. = R.S.

Evaluate the methods used in Solving a Linear System by Elimination

1. Intersecting Lines.
2. Intersecting Lines Involving Fractions
3. Parallel Lines
4. Coincidental Lines.

Summaries the approaches used in each. Be as concise as you can.

Hints:

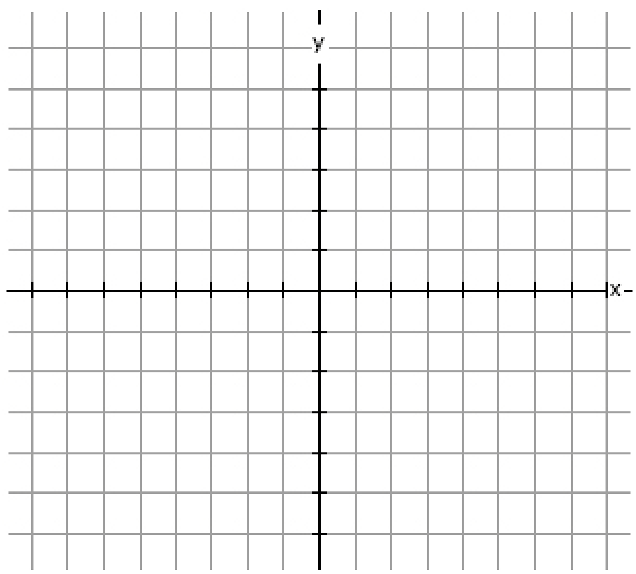
- *Remember the patterns that were outlined for solving linear systems using substitution and graphing for each along with the model for elimination that we just did.*
- *Use examples to support your ideas*.)

OFF COMPUTER EXERCISES

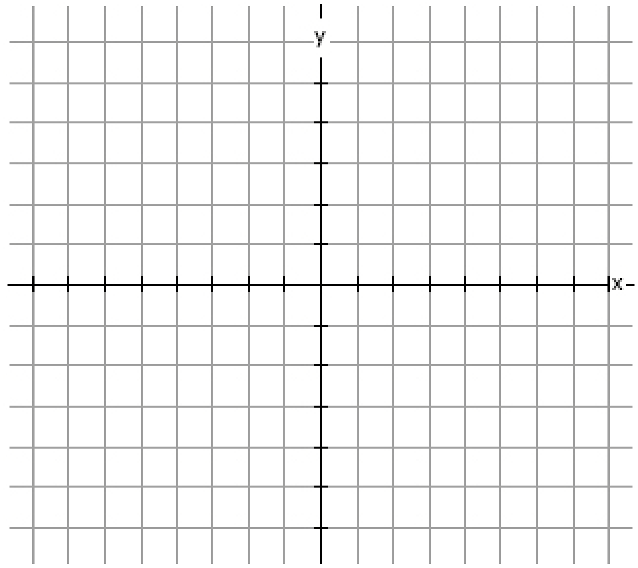
1. Find the solution to each system of linear equations by **graphing.**

(a) $y = -x + 4$

$y = 2x - 5$



(b) y = 4x - 1
y = 2x – 9



2. Solve the following linear systems by **substitution.** *(Show all your steps and make sure you check your solutions.)*

(a) $y = x + 1$

$2x + y + 5 = 0$

(b) $x + y + 6 = 0$

$4x - y + 9 = 0$

(c) $5x + 2y = 14$

$8x + 4y - 28 = 0$

(d) $x - y = 10$

$2x - y = 16$

3. Solve the following linear systems by **elimination.** *(Show all your steps and make sure you check your solutions.)*

(a) $x + 3y = 6$

$2x - 3y = 12$

(b) $3x - 5y = 32$

$2x + y = 4$

(c) $3x + 2y = 5$

$4x + 3y = 2$

(d) $x + y = 11$

$-2x + 6y = 2$