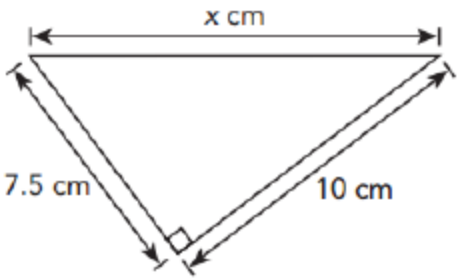
Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

Week 1 Friday Course 3 Warm-up

Find the Slope
(-4, 7) (-6, -4)

Pythagorean Theorem



Simplify the Expression
Write in Exponential Notation

$$63x^9y^7 \div 9x^3y^4$$

Simplify Expression
Write as positive exponent

$$[12^2 \cdot 3^2]^3 \div 3^6$$

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Week 1 Friday Course 3 Warm-up

Find the Slope
(-4, 7) (-6, -4)

$\frac{-4-7}{-6-(-4)} = \frac{-11}{-2} = \frac{11}{2}$

Given two points: (x_1, y_1) (x_2, y_2)

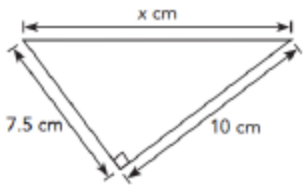
Slope Formula:

$$\frac{y_2 - y_1}{x_2 - x_1}$$

Paradise Education Center
Soaring Above The Rest!

Pythagorean Theorem

$x^2 = 10^2 + 7.5^2$
$x^2 = 100 + 56.25$
$x^2 = 156.25$
$x = \sqrt{156.25}$
$x = 12.5$



Simplify the Expression
Write in Exponential Notation

$63x^9y^7 \div 9x^3y^4$

$7x^6y^3$

Simplify Expression
Write as positive exponent

$[12^2 \cdot 3^2]^3 \div 3^6$

12^6

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

Quick Write- You have learned to solve systems of linear equations using table of values. Why would you want to use a different approach to solve systems of linear equations?

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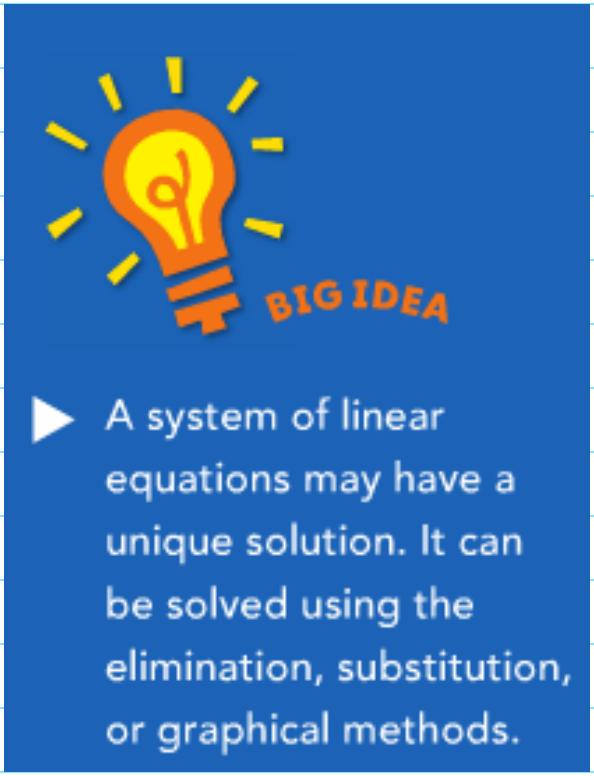
Objective

TSW solve systems of linear equations by finding the unique solution using the following strategy…

*Creating a table

*Elimination Method



Common Core State Standards

8EE 8a Understand that solutions to a system…satisfy both equations simultaneously. 8EE 8 b Solve Systems of two linear equations in two variables algebraically

Mathematical Practices *2 Reason 3 Construct arguments 4 Model Mathematics*

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

Vocabulary:

Common Terms

Example	Non-Example
$x + y = 8$ $x + 2y = 10$	$3x + 2y = 6$ $x + 6y = 10$
$2a + 3b = 29$ $2a - b = 17$	$a + 7b = 28$ $4a + 2b = 15$
$4x + y = 9$ $3x - y = 5$	$2x + 7y = -32$ $4x - 5y = 12$

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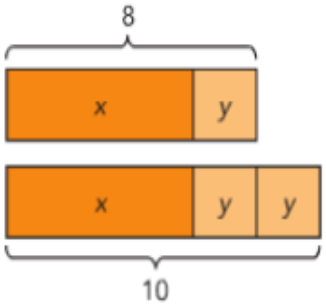
Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

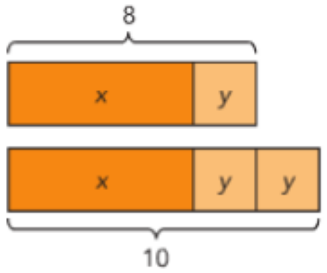
Solve Systems of Linear Equations with Common terms using Elimination Method		
Visualize Bar Model $x + y = 8$ — Equation 1 $x + 2y = 10$ — Equation 2  X= Y=	**Questions to Ask Self…** Do the two equations have common terms? Which variable is easier to eliminate? What operation do I need to complete to eliminate variable? (If subtracting be sure to distribute minus sign across all terms) Did I substitute value to find unique solution?	**Algebraically** Substitute Value- X= Y=

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

Solve Systems of Linear Equations with Common terms using Elimination Method

Visualize Bar Model

$x + y = 8$ — Equation 1
$x + 2y = 10$ — Equation 2



X=6
Y=2

Questions to Ask Self…

Do the two equations have common terms? Yes, x is the same

Which variable is easier to eliminate? X

What operation do I need to complete to eliminate variable? (If subtracting be sure to distribute minus sign across all terms) To eliminate X you will have to subtract just like bar model

Did I substitute value to find unique solution? Yes

Algebraically

Left side:	Right side:
$x + 2y$	10
$-x - y$	-8
y	2

So, $y = 2$.

Substitute Value-

Substitute 2 for y into Equation 1:

$x + 2 = 8$
$x + 2 - 2 = 8 - 2$
$x = 6$

X= 6
Y= 2

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

Example 2 Solve Systems of Linear Equations with Common terms using Elimination Method

Questions to Ask Self…	**Algebraically**
Do the two equations have common terms?	$4x + y = 9$ — Equation 1 $3x - y = 5$ — Equation 2
Which variable is easier to eliminate?	
What operation do I need to complete to eliminate variable? (If subtracting be sure to distribute minus sign across all terms)	Substitute Value-
Did I substitute value to find unique solution?	X= Y=

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

Example 2 Solve Systems of Linear Equations with Common terms using Elimination Method

Questions to Ask Self…

Do the two equations have common terms?

Yes, y is the common term

Which variable is easier to eliminate?

y

What operation do I need to complete to eliminate variable? (If subtracting be sure to distribute minus sign across all terms)

Y already eliminates itself because (-y) + (y) = 0.

So I am going to add equations.

Did I substitute value to find unique solution?

Yes

Algebraically

$4x + y = 9$ — Equation 1

$3x - y = 5$ — Equation 2

Add Equation 1 and Equation 2:

$(4x + y) + (3x - y) = 9 + 5$

$4x + 3x + y - y = 14$

$7x = 14$

$\frac{7x}{7} = \frac{14}{7}$

$x = 2$

Substitute Value-

To find y, substitute 2 for x into Equation 1 or Equation 2:

$4(2) + y = 9$

$8 + y = 9$ Simplify.

$y = 1$ Subtract 8 from both sides.

X= 2

Y=1

Guided Practice

Solve each system of linear equations using the elimination method.

1 $2a + 3b = 29$ — Equation 1

$2a - b = 17$ — Equation 2

Guided Practice

Solve each system of linear equations using the elimination method.

1 $2a + 3b = 29$ — Equation 1
$2a - b = 17$ — Equation 2

Subtract Equation 2 from Equation 1:

$2a + 3b - (2a - b) = 29 - 17$

$\_?\_ = \_?\_$ Use the distributive property. $2a + 3b - 2a + b;\ 12$

$\_?\_ = \_?\_$ Group like terms and simplify. The variable a is eliminated $4b;\ 12$

$\frac{?}{?} = \frac{?}{?}$ Divide both sides by $\_?\_$. $\frac{4b}{4};\ \frac{12}{4};\ 4$

$b = \_?\_$ Simplify. 3

Substitute $\_?\_$ for b into Equation 2: 3

$2a - \_?\_ = 17$ 3

$\_?\_ = \_?\_$ Add $\_?\_$ to both sides. $2a - 3 + 3;\ 17 + 3;\ 3$

$\_?\_ = \_?\_$ Simplify. $2a;\ 20$

$\_?\_ = \_?\_$ Divide both sides by $\_?\_$. $\frac{2a}{2};\ \frac{20}{2};\ 2$

$a = \_?\_$ Simplify. 10

The solution to the system of linear equations is $a = \_?\_$, $b = \_?\_$. $10;\ 3$

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

2 $2x - y = 2$

$3x + y = 13$

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

2 $2x - y = 2$

$3x + y = 13$

$x = 3, y = 4$

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

3 $x + 6y = 1$

$x + y = 6$

3 $x + 6y = 1$

$x + y = 6$

$x = 7, y = -1$

Lesson 5.1 Solving Systems of Linear Equations Using Elimination Method

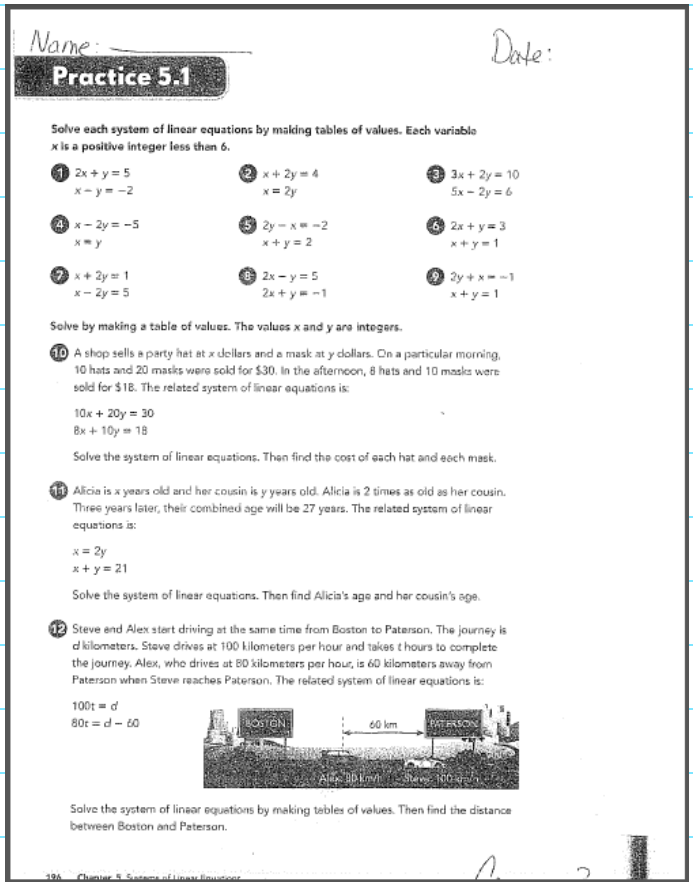
Practice 5.1 Will be Monday's hmwk

Challenge-

*Solve created equations

"Pick a Snowflake"

*Create Word-toon for vocabulary words



Name: _____ Date: _____

Practice 5.1

Solve each system of linear equations by making tables of values. Each variable x is a positive integer less than 6.

1. $2x + y = 5$, $x - y = -2$
2. $x + 2y = 4$, $x = 2y$
3. $3x + 2y = 10$, $5x - 2y = 6$
4. $x - 2y = -5$, $x = y$
5. $2y - x = -2$, $x + y = 2$
6. $2x + y = 3$, $x + y = 1$
7. $x + 2y = 1$, $x - 2y = 5$
8. $2x - y = 5$, $2x + y = -1$
9. $2y + x = -1$, $x + y = 1$

Solve by making a table of values. The values x and y are integers.

10. A shop sells a party hat at x dollars and a mask at y dollars. On a particular morning, 10 hats and 20 masks were sold for $30. In the afternoon, 8 hats and 10 masks were sold for $18. The related system of linear equations is:

    $10x + 20y = 30$
    $8x + 10y = 18$

    Solve the system of linear equations. Then find the cost of each hat and each mask.

11. Alicia is x years old and her cousin is y years old. Alicia is 2 times as old as her cousin. Three years later, their combined age will be 27 years. The related system of linear equations is:

    $x = 2y$
    $x + y = 21$

    Solve the system of linear equations. Then find Alicia's age and her cousin's age.

12. Steve and Alex start driving at the same time from Boston to Paterson. The journey is d kilometers. Steve drives at 100 kilometers per hour and takes t hours to complete the journey. Alex, who drives at 80 kilometers per hour, is 60 kilometers away from Paterson when Steve reaches Paterson. The related system of linear equations is:

    $100t = d$
    $80t = d - 60$

    Solve the system of linear equations by making tables of values. Then find the distance between Boston and Paterson.

Lesson Check –#5 Can solve systems of equation by using elimination method