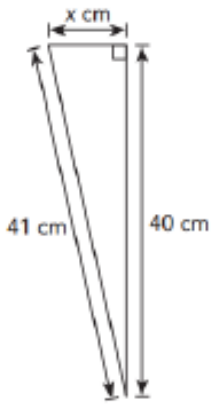
Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method Day 3

Week 1 Tuesday Course 3 Warm-up

Find the Slope
(19, 3) (20, 3)

Paradise Education Center
Soaring Above The Rest!

Pythagorean Theorem



Simplify the Expression
Write in Exponential Notation

$$\frac{a^9 \cdot a^2 \cdot a^3}{a^6 \cdot a^3 \cdot a^4}$$

Simplify Expression
Write as positive exponent

$$(c^7 \cdot c^3)^4 \div 6c^2$$

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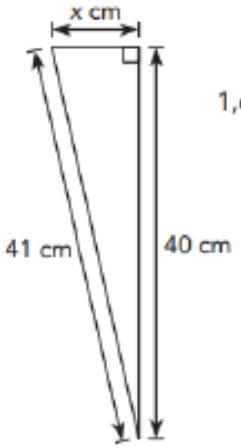
Find the Slope
(19, 3) (20, 3)

$\frac{3-3}{20-19} = \frac{0}{1}$ m=0

Pythagorean Theorem



$41^2 = 40^2 + x^2$
$1{,}681 = 1{,}600 + x^2$
$1{,}681 - 1{,}600 = 1{,}600 + x^2 - 1{,}600$
$81 = x^2$
$x = \sqrt{81}$
$x = 9$

Simplify the Expression
Write in Exponential Notation

$$\frac{a^9 \cdot a^2 \cdot a^3}{a^6 \cdot a^3 \cdot a^4}$$

a

Simplify Expression
Write as positive exponent

$$(c^7 \cdot c^3)^4 \div 6c^2$$

$$\frac{c^{38}}{6}$$

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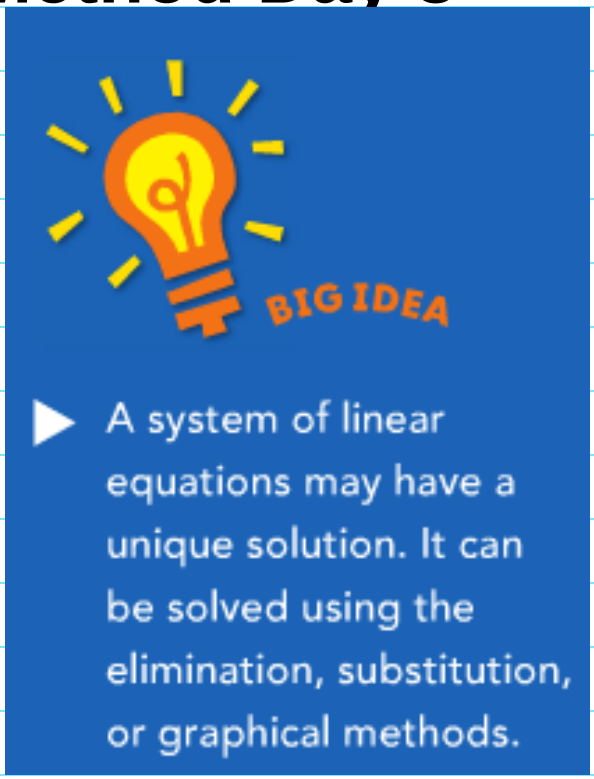
Objective

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

*__Elimination Method with__ and __without common terms__



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*

Review Key Vocabulary- with and without Common Terms

Vocabulary:

Common Terms

The same term that appears more than once in a system of linear equations

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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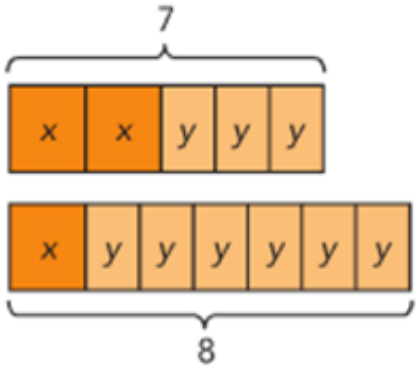
Visual Bar Example

$2x + 3y = 7$ — Equation 1

$x + 6y = 8$ — Equation 2



Can I find out what the value x or y?

Redraw so they have common terms

X=

Y=

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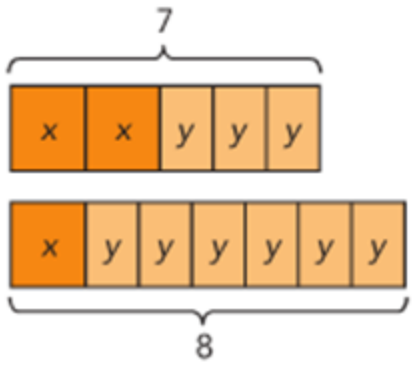
Visual Bar Example

$2x + 3y = 7$ — Equation 1

$x + 6y = 8$ — Equation 2



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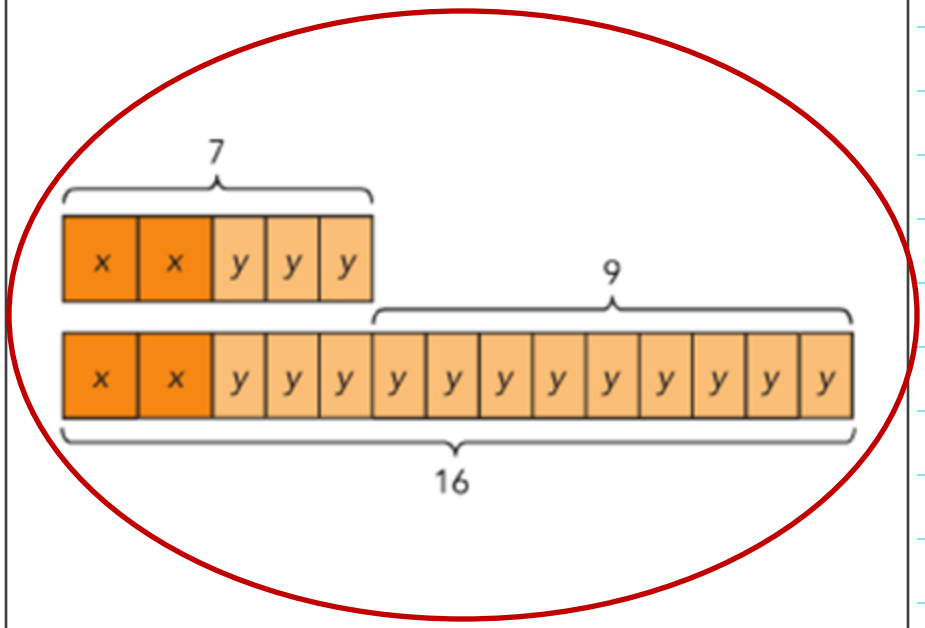

X= 2

Y= 1

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Algebraically

$2x + 3y = 7$ — Equation 1

$x + 6y = 8$ — Equation 2

X=

Y=

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method Day 3

Algebraically

$2x + 3y = 7$ — Equation 1
$x + 6y = 8$ — Equation 2

$2 \cdot (x + 6y) = 2 \cdot 8$
$2x + 12y = 16$ — Equation 3

Use the distributive property and simplify.

X=
y=

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method Day 3

Example 3 **Solve systems of linear equations without common terms using the elimination method.**

Solve the system of linear equations using the elimination method.

$2x + 5y = 11$ — Equation 1

$9x + 2y = -12$ — Equation 2

Example 3 Solve systems of linear equations without common terms using the elimination method.

Solve the system of linear equations using the elimination method.

$2x + 5y = 11$ — Equation 1
$9x + 2y = -12$ — Equation 2

Method 2

Eliminate the y terms first.

Multiply Equation 1 by 2:

$2 \cdot (2x + 5y) = 2 \cdot 11$

$4x + 10y = 22$ — Equation 5

Multiply Equation 2 by 5:

$5 \cdot (9x + 2y) = 5 \cdot (-12)$

$45x + 10y = -60$ — Equation 6

Subtract Equation 6 from Equation 5:

$(4x + 10y) - (45x + 10y) = 22 - (-60)$

$4x + 10y - 45x - 10y = 82$ Use the distributive property.

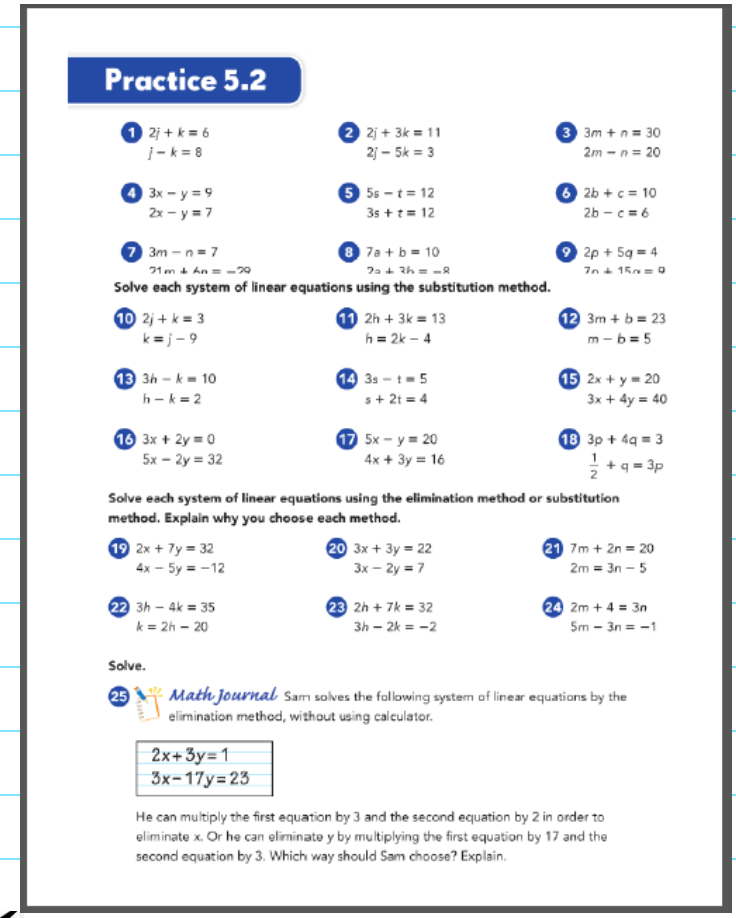
$-41x = 82$ Simplify.

$x = -2$ Divide both sides by -41.

Either way, the solution to the system is given by $x = -2$ and $y = 3$.

Lesson 5.2 Solving Systems of Linear Equations Using Elimination Method

Practice 5.2



Practice 5.2

1. $2j + k = 6$, $j - k = 8$
2. $2j + 3k = 11$, $2j - 5k = 3$
3. $3m + n = 30$, $2m - n = 20$
4. $3x - y = 9$, $2x - y = 7$
5. $5s - t = 12$, $3s + t = 12$
6. $2b + c = 10$, $2b - c = 6$
7. $3m - n = 7$, $21m + 4n = -29$
8. $7a + b = 10$, $2a + 3b = -8$
9. $2p + 5q = 4$, $7p + 15q = 9$

Solve each system of linear equations using the substitution method.

10. $2j + k = 3$, $k = j - 9$
11. $2h + 3k = 13$, $h = 2k - 4$
12. $3m + b = 23$, $m - b = 5$
13. $3h - k = 10$, $h - k = 2$
14. $3s - t = 5$, $s + 2t = 4$
15. $2x + y = 20$, $3x + 4y = 40$
16. $3x + 2y = 0$, $5x - 2y = 32$
17. $5x - y = 20$, $4x + 3y = 16$
18. $3p + 4q = 3$, $\frac{1}{2} + q = 3p$

Solve each system of linear equations using the elimination method or substitution method. Explain why you choose each method.

19. $2x + 7y = 32$, $4x - 5y = -12$
20. $3x + 3y = 22$, $3x - 2y = 7$
21. $7m + 2n = 20$, $2m = 3n - 5$
22. $3h - 4k = 35$, $k = 2h - 20$
23. $2h + 7k = 32$, $3h - 2k = -2$
24. $2m + 4 = 3n$, $5m - 3n = -1$

Solve.

25. *Math Journal* Sam solves the following system of linear equations by the elimination method, without using calculator.

$$\begin{aligned} 2x+3y&=1 \\ 3x-17y&=23 \end{aligned}$$

He can multiply the first equation by 3 and the second equation by 2 in order to eliminate x. Or he can eliminate y by multiplying the first equation by 17 and the second equation by 3. Which way should Sam choose? Explain.

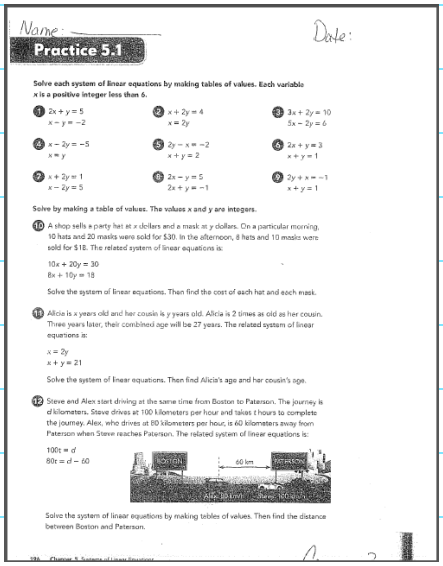
Challenge-

*Solve created equations

"Pick a Snowflake"

*Real World Problem (website)

*BuzzMath



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 #1-6-Can Solve Systems of linear equations by the elimination method