



## Summer Work 2026

### *Maneuvering the Middle - Unit One: Equations and Inequalities*

Algebra I Students,

Your summer work this year will be to complete Unit One of our Algebra I curriculum. Attached to this letter, you will find the packet materials. Included are *student handouts*, *homework*, and *extra-practice pages* for 8 lessons, two *quizzes*, and a *study guide* for the unit. Most of this material was covered in 7th-grade Pre-Algebra, so should be familiar to you. The only lesson we did not cover last year was Literal Equations.

Here is the sequence of lessons, extra practice, and quizzes you should follow:

- Lesson 1: Simplifying Expressions
  - Fill out Student Handout 1 from the Key posted in your Algebra I Google Classroom.
  - Complete Homework 1 and *only check with the answer key when you have finished the homework.*
  - Complete *Combining Like Terms* Kuta worksheet and *check with the answer key when you have finished the worksheet.*
  
- Lesson 2: Simplifying Expressions with the Distributive Property
  - Student Handout 2
  - Homework 2
  - Error Analysis* worksheets
  
- Lesson 3: Multi-step Equations
  - Student Handout 3
  - Homework 3
  - Multi-step Equations Maze*
  
- Lesson 4: Equations with Variables on Both Sides
  - Student Handout 4
  - Homework 4
  - Multi-step Equations* Kuta Worksheet
  
- QUIZ 1 (*no answers are posted - I will grade these when you return to school*)

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ALGEBRA 1 CURRICULUM

# EQUATIONS & INEQUALITIES

UNIT ONE: N.Q.1, A.SSE.1A, A.SSE.2,  
A.REI.1, A.REI.3, A.CED.1, A.CED.4

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## SIMPLIFYING EXPRESSIONS

### EXPRESSIONS

- An expression is a mathematical phrase that may contain numbers, variables and/or operators (like \_\_\_\_\_ and \_\_\_\_\_).
- A variable is a \_\_\_\_\_ that represents an unknown value.

### TERMS & COEFFICIENTS

- Terms are separated by \_\_\_\_\_ and \_\_\_\_\_ signs.
- The coefficient is the value in front of a \_\_\_\_\_ in a term.
- A term without any variables is known as a \_\_\_\_\_.

Based on the definitions above, complete the table for each expression below.

$$5x + 17 - 11y$$

TERMS	
VARIABLES	
COEFFICIENTS	
CONSTANTS	

$$-2.5y - 8 + z + 9$$

TERMS	
VARIABLES	
COEFFICIENTS	
CONSTANTS	

### LIKE TERMS

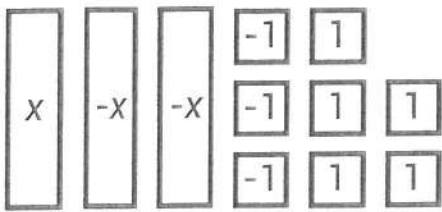
- Like terms have both the same \_\_\_\_\_ (or variable) and the same \_\_\_\_\_ (or power).

Classify each pair of terms as "like" or "unlike". Explain your reasoning in the last column.

TERMS	LIKE OR UNLIKE?	EXPLAIN
$-3c$ and $5c^2$		
$\frac{1}{4}$ and $20$		
$8.5x$ and $8.5y$		
$100p$ and $-p$		


Expressions do not contain \_\_\_\_\_ signs, and therefore cannot be solved. However, expressions can be \_\_\_\_\_ by \_\_\_\_\_ like terms.

Use algebra tiles to model the expressions in 1-3 (the first has been given as an example). Then, record the simplified version of the expression.

<p>1.</p> $x - 2x - 3 + 5$  <p>_____</p>	<p>2.</p> $2 + 2x - 4x - 3$ <p>_____</p>	<p>3.</p> $-x + x - 5 - 1 + x$ <p>_____</p>
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Simplify each of the expressions below by combining like terms.

<p>4.</p> $18 + 21r - 4r + 19n - 3$ <p>_____</p>	<p>5.</p> $-x + 6y - 9x - 2y - 4y$ <p>_____</p>	<p>6.</p> $1.7 + 8.2j - 3.4 + 4.7j$ <p>_____</p>
<p>7.</p> $-4\frac{1}{2}x + 15 + \frac{7}{2}x - 23$ <p>_____</p>	<p>8.</p> $4a - 7.5b + 9b - 2.1a$ <p>_____</p>	<p>9.</p> $\frac{3}{8} + 15g - \frac{11}{8}g - 13g + \frac{1}{8}$ <p>_____</p>

<p>10. Simplify an expression for the perimeter of the rectangle.</p> <div style="text-align: center; margin-bottom: 10px;"> <math>24.6x - 10.4</math> </div>  <p style="text-align: right; margin-right: 100px;"><math>7x + 3.1</math></p> <p style="text-align: center;">Perimeter: _____</p>	<p>11. Marge simplified the expression as shown below.</p> $-8b + 15b + 14 \rightarrow 21b$ <p>What mistake did Marge make, and what is the correct simplified version of the expression?</p>
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Summarize today's lesson:

## SIMPLIFYING EXPRESSIONS

Solve each of the problems below. Be sure to show all work.

<p>1. Which of the following is an example of like terms?</p> <p>a. <math>-16</math> and <math>-16x</math>          b. <math>x</math> and <math>x^2</math>          c. <math>50y</math> and <math>-y</math>          d. <math>2a</math> and <math>2</math></p>	<p>2. Which of the following is NOT true about the expression given below?</p> <p style="text-align: center;"><math>14b - 7 + 8b + b</math></p> <p>a. There are three terms          b. There is one constant term          c. The coefficients are 14, 8 and 1          d. Three of the terms are like terms</p>
<p>3. Write a simplified algebraic expression for the model.</p> <div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 100px; text-align: center; line-height: 100px;">x</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 100px; text-align: center; line-height: 100px;">x</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 100px; text-align: center; line-height: 100px;">-x</div> <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">-1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">-1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">-1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">-1</div> </div> <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">-1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">-1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">1</div> </div> <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">1</div> </div> </div> <p style="text-align: right; margin-top: 10px;">_____</p>	<p>4. Write a simplified algebraic expression for the model.</p> <div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 100px; text-align: center; line-height: 100px;">-x</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 100px; text-align: center; line-height: 100px;">-x</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 100px; text-align: center; line-height: 100px;">-x</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 100px; text-align: center; line-height: 100px;">-x</div> <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">1</div> </div> <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">1</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">-1</div> </div> </div> <p style="text-align: right; margin-top: 10px;">_____</p>

Simplify the expressions in 5-9.

<p>5.</p> <p style="text-align: center;"><math>-4w + 17 - 10w + w</math></p> <p style="text-align: right; margin-top: 20px;">_____</p>	<p>6.</p> <p style="text-align: center;"><math>-8 + 2x + 17 - 9x + 20</math></p> <p style="text-align: right; margin-top: 20px;">_____</p>	<p>7.</p> <p style="text-align: center;"><math>-1.5p - 16.5 + 30 + 4.5p</math></p> <p style="text-align: right; margin-top: 20px;">_____</p>
<p>8.</p> <p style="text-align: center;"><math>\frac{2}{3}y - 25 + \frac{4}{3}y + 26</math></p> <p style="text-align: right; margin-top: 20px;">_____</p>	<p>9.</p> <p style="text-align: center;"><math>13.8b - 2.2 + 9.6 + 10.8b - b</math></p> <p style="text-align: right; margin-top: 20px;">_____</p>	

<p>10. Matt and Noah simplified the expressions as shown. Who made a mistake, and what should the correct simplified version of the expression be?</p> <p style="text-align: right; margin-top: 20px;">_____</p>	<p><b>MATT</b></p> <div style="border: 1px solid black; padding: 5px; margin: 5px auto; width: 80%;"> <math>12x - 9x + 16 - 0.2x</math>   <math>-13.2x</math> </div>	<p><b>NOAH</b></p> <div style="border: 1px solid black; padding: 5px; margin: 5px auto; width: 80%;"> <math>-0.4n + 33n - 1.2 + 6</math>   <math>32.6n + 4.8</math> </div>
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## Combining Like Terms

Simplify each expression.

1)  $-6k + 7k$

2)  $12r - 8 - 12$

3)  $n - 10 + 9n - 3$

4)  $-4x - 10x$

5)  $-r - 10r$

6)  $-2x + 11 + 6x$

7)  $11r - 12r$

8)  $-v + 12v$

9)  $-8x - 11x$

10)  $4p + 2p$

11)  $5n + 11n$

12)  $n + 4 - 9 - 5n$

13)  $12r + 5 + 3r - 5$

14)  $-5 + 9n + 6$

## SIMPLIFYING EXPRESSIONS WITH THE DISTRIBUTIVE PROPERTY

a. Write in words the meaning of  $3(12)$ .

b. Applying your thinking from part a, write the meaning of  $3(x - 4)$ .

c. Use algebra tiles to sketch  $3(x - 4)$ . Then, write the simplified expression.

d. Explain a method for finding the simplified expression of  $3(x - 4)$  without algebra tiles.

### DISTRIBUTIVE PROPERTY

• The distributive property allows us to multiply each term \_\_\_\_\_ the parentheses by the number \_\_\_\_\_ the parentheses.

• Algebraically, we would say:

$$a(b + c) = \underline{\hspace{2cm}} \quad a(b - c) = \underline{\hspace{2cm}}$$

• Be careful with your \_\_\_\_\_ when multiplying positives and negatives!

Using the distributive property, simplify the following expressions.

1. $4(x + 2)$	2. $-(5x - 7)$	3. $-8(0.25x + 2)$
4. $\frac{1}{2}(x - 9)$	5. $14 - 6(3x - 1.5)$	

What makes question 5 different than questions 1-4?

Simplify the expressions by distributing and combining like terms, if necessary.

<p>6.</p> $16x + 5.6(2x - 11)$ <p>_____</p>	<p>7.</p> $13(1.4 + 2w)$ <p>_____</p>	<p>8.</p> $\frac{3}{4}(16m - 5) - \frac{3}{2}$ <p>_____</p>
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<p>9.</p> $15.4 - 5.2(3f + 1.2)$ <p>_____</p>	<p>10.</p> $\frac{5}{8}x - 2(7 - \frac{1}{4}x)$ <p>_____</p>
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11. Shondra simplified the following expression but made an error. Describe her mistake and then correctly simplify the expression.

$$26.7 - 6.3(6x - 10.1)$$

$$26.7 - 37.8x - 63.63$$

$$-37.8x - 36.93$$

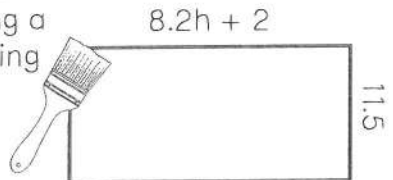
12. Glenn simplified the following expression but made an error. Describe his mistake and then correctly simplify the expression.

$$18 + \frac{3}{5}(6x - 15)$$

$$3 + \frac{3}{5}(6x)$$

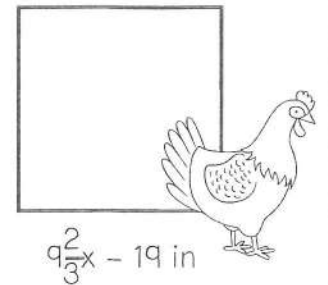
$$3 + \frac{18}{5}x$$

13. Oscar is painting a wall with the following dimensions.



- a. Circle the unit of measurement that would be appropriate for the height of the wall.
- a. ft<sup>2</sup>                      b. ft                      c. ft<sup>3</sup>
- b. Write the simplified expression for the area of the wall using the correct units.
- \_\_\_\_\_

14. Georgia is fencing in a section of her yard for a chicken coop. The area will be square-shaped. Write the expression that represents the amount of fencing she will need.



Summarize today's lesson:

## SIMPLIFYING EXPRESSIONS WITH THE DISTRIBUTIVE PROPERTY

Each of the cards on the left simplifies to the same expression as one of the cards on the right. Find the matching expressions to complete the sentences below.

**A**  
 $-1 + 0.4(3x - 20)$

**B**  
 $5x - 7.4(x - 3) + 8.1$

**C**  
 $-6 + \frac{1}{4}x + 3(\frac{1}{4}x + 6)$

**D**  
 $16.5 - 2(5.1x + 9)$

**E**  
 $12 + 5(4x - 6)$

**F**  
 $17x - 4(4x - 3)$

**G**  
 $-0.8(3x - 31) + 5.5$

**H**  
 $-22.8 + 0.6(2x + 23)$

**I**  
 $11x + 3(3x - 6)$

**J**  
 $-4.2x - 3(2x + 0.5)$

1. Card A and Card \_\_\_\_\_ simplify to the expression \_\_\_\_\_.
2. Card B and Card \_\_\_\_\_ simplify to the expression \_\_\_\_\_.
3. Card C and Card \_\_\_\_\_ simplify to the expression \_\_\_\_\_.
4. Card D and Card \_\_\_\_\_ simplify to the expression \_\_\_\_\_.
5. Card E and Card \_\_\_\_\_ simplify to the expression \_\_\_\_\_.



Name: \_\_\_\_\_

Period: \_\_\_\_\_

Date: \_\_\_\_\_

## Error Analysis: Simplifying Algebraic Expressions

Directions: Read the problem below. The problem was solved incorrectly. Find the error that was made and explain it. Then answer the problem correctly.

Problem	Explain Mistake Made	Correct Work and Answer
Simplify: $4x + 8 + 3(x - 4)$ Student Work: $4x + 8 + 3(x - 4)$ $4x + 8 + 3x - 4$ $7x + 8 - 4$ $7x + 4$	_____ _____ _____ _____ _____	Answer: _____



Name: \_\_\_\_\_

Period: \_\_\_\_\_

Date: \_\_\_\_\_

## Error Analysis: Simplifying Algebraic Expressions

Directions: Read the problem below. The problem was solved incorrectly. Find the error that was made and explain it. Then answer the problem correctly.

Problem	Explain Mistake Made	Correct Work and Answer
<p>Simplify:</p> $5(-3x + 8) + 2x + 6$ <p>Student Work:</p> $5(-3x + 8) + 2x + 6$ $-5x + 40 + 2x + 6$ $-3x + 40 + 6$ $-3x + 46$	<p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Answer: _____</p>

## SOLVING MULTI-STEP EQUATIONS

- a. Label each part of the equation at the right.  
b. Explain what it means to solve an equation:

$$\underbrace{30x}_{\text{term}} + \underbrace{8}_{\text{constant}} = \underbrace{-6}_{\text{constant}}$$

### SOLVING EQUATIONS

- The goal in solving an equation is to \_\_\_\_\_ the variable by using \_\_\_\_\_, or opposite, operations.

### STEPS TO SOLVE

- \_\_\_\_\_ if necessary
- \_\_\_\_\_ any like terms
- Isolate the variable:
  - Use **addition/subtraction** to remove the \_\_\_\_\_.
  - Use **multiplication/division** to remove the \_\_\_\_\_.

Explain in your own words how you can check your solution after solving:

Solve each of the equations below. Be sure to show all work and your check-step.

$$8x - 14 + 16x + 5 = 39$$

CHECK:

$$-3(12x + 9) = 99$$

CHECK:

$$-(2x + 5) + 14 = 22$$

CHECK:

$$3.4(x + 7) - 2.1x = 35.5$$

CHECK:

Solve each of the following multi-step equations.

1.

$$\frac{1}{2}(b - 10) + 2b = 25$$

2.

$$16.75 + 3.2d - 4 + 6d = 51.39$$

3.

$$19 - 5(2m - 3) + 9m = 36$$

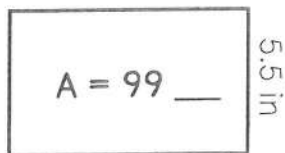
4. What value of  $n$  makes the following equation true?

$$3.5 - (n + 21) - 4n = -45$$

5. Determine if  $-6$  is the solution to the equation below. Explain your reasoning.

$$8(0.25x + 5) - 25 = 3$$

6. Ms. Cho gives her class the rectangle shown below. Use the dimensions of the rectangle to fill in the appropriate units for the area of the rectangle, then complete a-c.



$$8x + 2 \text{ in}$$

a. Write an equation to represent the situation: \_\_\_\_\_

b. What is the value of  $x$ ? \_\_\_\_\_

c. What are the dimensions of the rectangle? \_\_\_\_\_

7. Eva bought popcorn, candy and a drink at the movies. The popcorn was three times as expensive as the candy and the drink was twice as expensive as the candy. Eva spent a total of \$10.50.

a. Write an equation to represent the situation. Let  $c$  represent the cost of the candy.

b. Find the value of  $c$ .

c. How much did Eva's drink cost?

8. The perimeter of the equilateral triangle is 157.5 inches.



a. Write an equation to represent the situation.

b. Find the value of  $x$ .

Summarize today's lesson:

## SOLVING MULTI-STEP EQUATIONS

1. Mateo is going to solve the equation below. Which of the following represents the equation after combining the like terms?

$$-8x + 23 - 22x + 9 = 182$$

- a.  $14x + 32 = 182$
- b.  $-30x + 32 = 182$
- c.  $14x + 14 = 182$
- d.  $-30x + 14 = 182$

2. Joy is going to solve the equation below. Which of the following represents the equation after distributing and combining like terms?

$$14 - 7(2x - 8) = 21$$

- a.  $-14x + 70 = 21$
- b.  $14x - 56 = 21$
- c.  $56x = 21$
- d.  $-14x - 42 = 21$

Solve each of the following equations. Be sure to show all work.

3.  $4(8x + 4) - 20 = -20$

\_\_\_\_\_

4.  $-7b + 22 + b = 55$

\_\_\_\_\_

5.  $19 + 1.5(10m - 8) = 127$

\_\_\_\_\_

6.  $\frac{2}{3}(6k - 30) + k = 100$

\_\_\_\_\_

7.  $11 - (15g - 13) = -6$

\_\_\_\_\_

8.  $10.25 + 8.9c - 6 - 7c = 10.33$

\_\_\_\_\_

9. Use the hints to write the name of the student who solved each equation above the box:

$$2(4x - 12) + 1 = 9$$

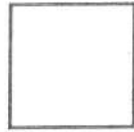
$$2.5x + 1 - 7x = -44$$

$$5 - 4(x - 3) = -15$$

- Rob, Maddie and Belinda each solved an equation.
- The solution to Maddie's equation is twice the solution to Rob's equation.
- The solution to Belinda's equation is 2 more than the solution to Maddie's equation.

Solve each of the following multi-step equations.

10. The perimeter of the square below is 28.4 cm.



$$3.6x - 1.9$$

a. What is the value of  $x$ ? \_\_\_\_\_

b. Find the side length of the square: \_\_\_\_\_

11. A bus currently has three passengers, Crew, Marty and Blakely. Marty's age is 1.5 times Crew's age. Blakely's age is 0.75 times Crew's age. If the sum of the three ages is 104, find the age of each passenger.

Crew: \_\_\_\_\_

Marty: \_\_\_\_\_

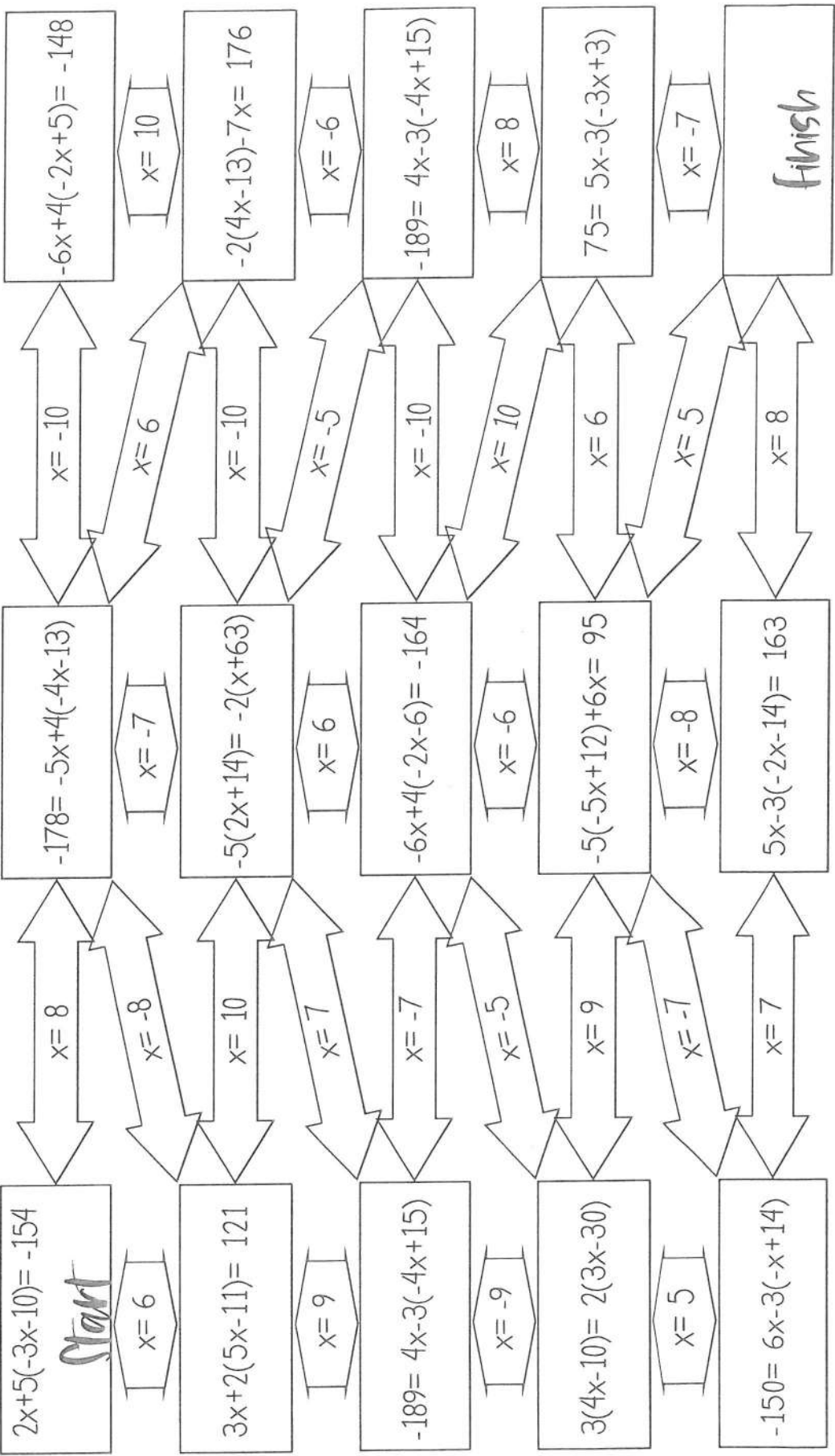
Blakely: \_\_\_\_\_

# Multi-Step Equations

Name \_\_\_\_\_

Work your way through the maze by solving the equations.

Begin at the "Start" box and work your way through the maze until you reach the "Finish" box.

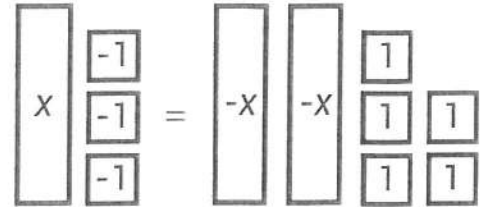


Some boxes might not be used

## EQUATIONS WITH VARIABLES ON BOTH SIDES

Keisha modeled the equation  $x - 3 = -2x + 5$  at the right.

- What do you notice about the equation?
- How can Keisha collect the variables on one side of the equation?
- How can Keisha collect the constants on one side of the equation?



### STEPS TO SOLVE

1. \_\_\_\_\_ and/or \_\_\_\_\_ like terms (if necessary)
2. Collect \_\_\_\_\_ on one side of the equal sign
3. Collect \_\_\_\_\_ on the other side of the equal sign
4. \_\_\_\_\_ the equation

Solve each of the equations below. Be sure to show each step of your work.

1. $11x - 8 = -7x + 64$	CHECK:
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2. $-2x + 9 = 5(2x - 3)$	CHECK:
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3. $5(k + 14) = \frac{1}{5}(20k - 80)$	4. $2 - 8(0.2h - 1) = 3.5h - 2.75$	5. $-(8 - 2n) = 8 - 2(12 - 3n)$
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Explain how you determined which side of the equation to collect your variable terms:

Solve each of the equations at the right.

What do you notice about each equation after solving? Compare and contrast the solutions.

$$4(2x - 4) = 8x + 3$$

$$-10x + 16 = -2(5x - 8)$$

TYPES OF SOLUTIONS	_____ SOLUTION	_____ SOLUTION	_____ REAL NUMBERS
	Only _____ value will make the equation true	There _____ a value that will make the equation true	_____ real number will make the equation true; _____ solutions
	Ex:	Ex:	Ex:

Solve each of the equations. Be sure to show all work.

6.  
 $7 - 0.5(10x - 4) = 3 - 5x + 6$

7.  
 $-(14 - 9c) = 4(2c + 5)$

8.  
 $-0.75(12x + 60) = -x - 8x - 15$

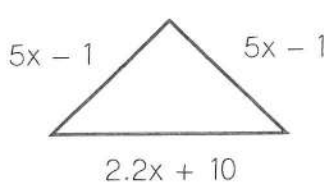
Write an equation to solve each question below.

9. Gil has traveled 4.5 miles and continues at a speed of 62.5 miles per hour. Andy has traveled 29.5 miles and continues at a speed of 50 miles per hour. If the cars continue at the same speed, how many hours will it take until Andy and Gil travel the same number of miles?

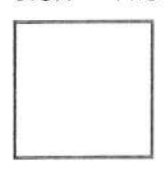
Equation: \_\_\_\_\_

Solution: \_\_\_\_\_

10. The perimeter of the triangle and the perimeter of the square are the same. What is the value of x?



6.5x - 11.8



Equation: \_\_\_\_\_

Solution: \_\_\_\_\_

Summarize today's lesson:

## EQUATIONS WITH VARIABLES ON BOTH SIDES

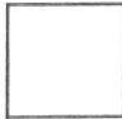
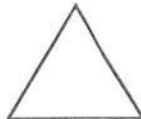
In 1-6, record the problem number in the box with the correct solution. Then solve questions 7 & 8.

$x = -2$

$x = 3.5$

NO SOLUTION

ALL REAL NUMBERS

<p>1. <math>58 - 8x = 30x - 75</math></p>	<p>2. <math>4.2(15 + 5x) = -20x - 21 - x</math></p>	<p>3. <math>-9.5(2x - 10) = 3.8(-5x + 25)</math></p>
<p>4. <math>-4x + 24 = 8 - \frac{2}{5}(10x - 60)</math></p>	<p>5. <math>-4x + 51 = 2x + 7(x + 11)</math></p>	<p>6. <math>5.5(2x + 1) = -5.5x + 63.25</math></p>
<p>7. A pool contains 50 gallons of water and is filling at a rate of 2.3 gallons per minute. A second pool contains 102.2 gallons of water and is draining at a rate of 3.5 gallons per minute. After how many minutes will the pools contain the same amount of water?</p> <p style="text-align: center;">_____</p>	<p>8. The square and equilateral triangle below have equal perimeters. Find the value of <math>x</math>. Then, calculate the perimeter of each shape.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p><math>7x - 8.1</math></p> </div> <div style="text-align: center;">  <p><math>10x - 13</math></p> </div> </div> <p style="text-align: right; margin-right: 50px;">x: _____</p> <p style="text-align: right;">Perimeter: _____</p>	

## Multi-Step Equations

Solve each equation.

1)  $-20 = -4x - 6x$

2)  $6 = 1 - 2n + 5$

3)  $8x - 2 = -9 + 7x$

4)  $a + 5 = -5a + 5$

5)  $4m - 4 = 4m$

6)  $p - 1 = 5p + 3p - 8$

7)  $5p - 14 = 8p + 4$

8)  $p - 4 = -9 + p$

9)  $-8 = -(x + 4)$

10)  $12 = -4(-6x - 3)$

11)  $14 = -(p - 8)$

12)  $-(7 - 4x) = 9$

13)  $-18 - 6k = 6(1 + 3k)$

14)  $5n + 34 = -2(1 - 7n)$

15)  $2(4x - 3) - 8 = 4 + 2x$

16)  $3n - 5 = -8(6 + 5n)$

17)  $-(1 + 7x) - 6(-7 - x) = 36$

18)  $-3(4x + 3) + 4(6x + 1) = 43$

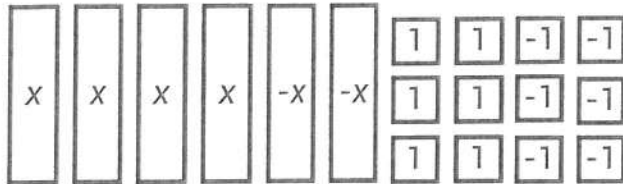
19)  $24a - 22 = -4(1 - 6a)$

20)  $-5(1 - 5x) + 5(-8x - 2) = -4x - 8x$

## QUIZ: EXPRESSIONS AND EQUATIONS

Show all work as you answer each question below. Record your solutions in the box at the right.

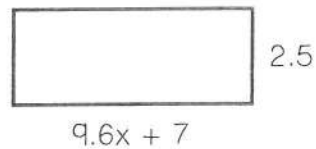
1. Write a simplified expression for the model below.



2. Which of the following expressions simplifies to  $-15a + 30$ ?

a.  $-3(-5a + 10)$       b.  $5(-3a - 6)$       c.  $-15(a + 2)$       d.  $6(-2.5a + 5)$

3. Write a simplified expression for the area of the rectangle at the right.



4. Which value of  $n$  makes the equation  $6.4n - 1.2 + 3n + 8.2 = 19.22$  true?

a.  $n = 11$       b.  $n = 2.9$       c.  $n = -8$       d.  $n = 1.3$

5. Which value of  $p$  makes the equation  $18 + 2(3p - 8) = -37$  true?

a.  $p = 2.05$       b.  $p = -6.5$       c.  $p = -7.83$       d.  $p = -0.5$

6. Solve the equation below.

$$-38 + 6x = -12x + 52$$

Answers

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

7. Solve the equation below.

$$1.6(15x + 25) = -6x - 5$$

8. Which value of  $w$  makes the equation below true?

$$11 + \frac{1}{3}(9w - 12) = -5(5 + w)$$

- a.  $w = -4$
- b.  $w = 9$
- c.  $w = -2.25$
- d.  $w = \text{all real numbers}$

9. Li uses 8.4 grams of sugar every day in her tea. Sue uses 12.6 grams of sugar every day in her coffee. If Li's sugar canister contains 128 grams of sugar and Sue's canister contains 191 grams, in how many days will Li and Sue have the same amount of sugar in their canisters?

10. The perimeter of the square and the equilateral triangle are equal. Which of the following is NOT a true statement about the figures?

- a. The value of  $x$  is 4.5.
- b. The perimeter of each figure is 36 units.
- c. Each side length of the square measures 6 units.
- d. Each side length of the triangle measures 12 units.





$2x$



$3x - 1.5$






Find the solution set for the following inequalities. For #7 and #8, find and graph the solution set.

<p>4.</p> $11 < -k + 19$ <p>_____</p>	<p>5.</p> $4.6f + 15 \geq 50.88$ <p>_____</p>	<p>6.</p> $\frac{3}{2}x + 14 \leq 7$ <p>_____</p>
<p>7.</p> $5d - 19.8 < 16.7$ 	<p>8.</p> $35 - 9x \leq 62$ 	
<p>9. What is the smallest value of <math>x</math> that is not a solution to <math>4x - 26 &lt; 4</math>?</p>	<p>10. Rashaj has \$37.25 in his wallet. He would like to purchase a movie ticket and some candy. The ticket costs \$7.25 and each box of candy costs \$3.75. He claims he can buy 5 boxes. Do you agree or disagree? Write and solve the inequality to explain your reasoning.</p>	
<p>11. Mason's pet leopard gecko must be kept in a cage with a temperature of at least 82°F. Using the inequality below, solve for <math>C</math> to determine the safe range of temperatures for his gecko in degrees Celsius.</p> $\frac{9}{5}C + 32 \geq 82$ <p>_____</p>	<p>12. Glenn has \$1,250 in his savings account. In order to avoid bank fees, Glenn must keep a minimum of \$150 in his account. His cell phone costs him \$35 per month. Use an inequality to determine how many months Glenn can pay for his cell phone before he would incur fees.</p> <p>_____</p>	

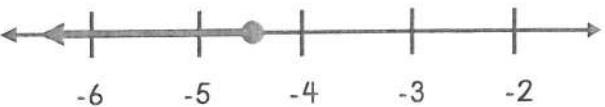
Summarize today's lesson:

## SOLVING ONE AND TWO-STEP INEQUALITIES

Find and graph the solution set for each of the following inequalities.

<p>1.</p> $-7.5k \geq -82.5$ 	<p>2.</p> $-6 > 3x - 15$ 	<p>3.</p> $-9.4d + 26 < 91.8$ 
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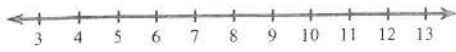
Solve the problems below and be sure to show all work.

<p>4. Which of the following values is not a solution to <math>-4x - 6.8 \leq 34</math>?</p> <p>a. <math>x = -9</math>  b. <math>x = -10.2</math>  c. <math>x = -11</math>  d. <math>x = -10</math></p>	<p>5. Which inequality describes the solution to <math>20x - 4 &gt; -34</math>?</p> <p>a. <math>x &lt; -1.9</math>  b. <math>x &gt; -1.5</math>  c. <math>x &gt; -1.9</math>  d. <math>x &lt; -1.5</math></p>
<p>6. Audrey's monthly car payment is \$350, and she needs to save at least \$35 each month for gas. If Audrey is paid \$17.50 an hour, write and solve an inequality to represent the number of hours she must work in a month to pay for her car payment and gas.</p> <p>_____</p>	<p>7. Da'Quan is reading a 532-page book for English. His teacher says that each student must have read at least half of the book by the end of the 1<sup>st</sup> week. If Da'Quan reads each of the 7 nights, write and solve an inequality to represent the number of pages he should read each night to meet the teacher's requirements.</p> <p>_____</p>
<p>8. Bacteria cannot live at temperatures higher than 120°F. Using the inequality below, solve for C to determine the temperatures in degrees Celsius in which bacteria cannot survive.</p> $\frac{9}{5}C + 32 \geq 120$ <p>_____</p>	<p>9. Carlos solved the inequality below and graphed the solution set:</p> $-19.5x + 21 < 108.75$  <p>Do you agree or disagree with Carlos' graph? Explain your reasoning.</p>

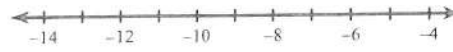
## Two-Step Inequalities

Solve each inequality and graph its solution.

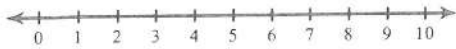
1)  $2x + 4 \geq 24$



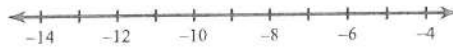
2)  $\frac{m}{3} - 3 \leq -6$



3)  $-3(p + 1) \leq -18$



4)  $-4(-4 + x) > 56$



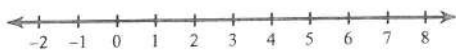
5)  $-b - 2 > 8$



6)  $-4(3 + n) > -32$



7)  $4 + \frac{n}{3} < 6$



8)  $-3(r - 4) \geq 0$



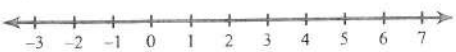
9)  $-7x + 7 \leq -56$



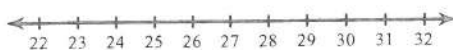
10)  $-3(p - 7) \geq 21$



11)  $-11x - 4 > -15$



12)  $\frac{-9 + a}{15} > 1$






## SOLVING MULTI-STEP INEQUALITIES

### STEPS TO SOLVE

1. \_\_\_\_\_ if necessary
  2. \_\_\_\_\_ any like terms
  3. Isolate the variable:
    - a. Use addition/subtraction to remove the \_\_\_\_\_.
    - b. Use multiplication/division to remove the \_\_\_\_\_.
- \*Remember to \_\_\_\_\_ the inequality sign if \_\_\_\_\_ or \_\_\_\_\_ by a negative value.

Solve each of the inequalities below. Be sure to show all work and your check-step. Then represent your solution on a number line.

1. $4x + 26 - 2x + 11 > 49$	2. $-2(3x + 15) \leq 42$	3. $-2x + 6(x - 8) + 10 < 2$
✓ CHECK:	✓ CHECK:	✓ CHECK:
		

Latisha says that  $x = 9$  could be a solution to all the inequalities above. Do you agree? Explain.

Show all work as you solve each inequality below.

<p>4. <math>4.5k + 18 - 24.1 - 1.3k \geq 14.7</math></p>	<p>5. <math>\frac{3}{4}(-x + 12) &lt; 18</math></p>	<p>6. <math>24 - 7.2(-4x + 3) \leq -26.4</math></p>
<p>7. Rodney is flying on an airplane to Puerto Rico. His suitcase and the contents inside must weigh less than 50lbs. His suitcase weighs 4 pounds and the contents he wants to pack weigh 49 pounds. If each of his shirts weighs 0.75 pounds, write an inequality to represent the number of shirts he needs to remove to meet the flight requirements.</p>		<p>8. Selene and Bennett are solving the inequality below. Selene says you will need to flip the inequality sign while Bennett claims you will not need to flip it. Who is correct? Explain your reasoning. <math>17 - 5(2x + 1) + 12x \leq -22</math></p>

Roll a number cube and solve the corresponding inequality for extra practice.

ROLL	INEQUALITY	SOLUTION
1	$-(x + 9) + 24 > 17$	
2	$\frac{1}{2}m + 2(m - 3) \leq 13$	
3	$5(-4x + 1) < 45$	
4	$s + 4 - 7s - 9 \geq 31$	
5	$16 > 11 - 2(x - 4)$	
6	$\frac{1}{3}(x - 27) + \frac{1}{3}x > 31$	

SHOW WORK HERE:

Summarize today's lesson:

## SOLVING MULTI-STEP INEQUALITIES

Of the five students who solved inequalities below, three made mistakes. Write the names of the students who made mistakes, describe their errors and record the correct solutions in the table.

BRYNN
$-7(x + 4) < 21$ $-7x - 28 < 21$ $-7x < 49$ $x < -7$

ROMAN
$-9r + 3.3 + 11.1 + 13r \geq 30$ $14.4 + 4r \geq 30$ $4r \geq 15.6$ $r \geq 3.9$

ALLEN
$-3(3x - 4) + 12 > 78$ $-9x - 4 + 12 > 78$ $-9x + 8 > 78$ $-9x > 70$ $x < 7.\bar{7}$

DEMETRIUS
$14 + 2(7x - 8) \leq 26$ $14 + 14x - 16 \leq 26$ $28x - 16 \leq 26$ $28x \leq 42$ $x \leq 1.5$

PILAR
$44 \geq -(x + 13) - 2x$ $44 \geq -x - 13 - 2x$ $44 \geq -13 - 3x$ $57 \geq -3x$ $x \geq -19$

NAME	DESCRIBE THE MISTAKE	CORRECT THE SOLUTION
1.		
2.		
3.		

Use your knowledge of inequalities to answer each question below.

4. Mrs. Kreger created the expression  $4(h + 11) - 15$  to estimate the number of hours,  $h$ , her students need to study each week to earn a certain grade average. According to the expression, how many hours per week does Lindsey need to study if she wants to have an average of at least 90?

\_\_\_\_\_

5. Which of the following is not a solution to the inequality below?

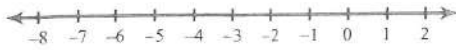
$$41 - 8(2x + 6) + 3x < 58$$

- a.  $x = 0$
- b.  $x = -5$
- c.  $x = -1$
- d.  $x = -3$

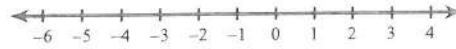
Multi-Step Inequalities

Solve each inequality and graph its solution.

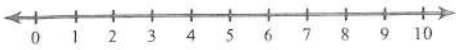
1)  $3 < -5n + 2n$



2)  $6x + 2 + 6x < 14$



3)  $-p - 4p > -10$



4)  $18 \geq 5k + 4k$



5)  $9 \geq -2m + 2 - 3$



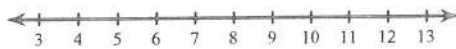
6)  $-3 - 6(4x + 6) > -111$



7)  $6 - 4(6n + 7) \geq 122$



8)  $-138 \geq -6(6b - 7)$



9)  $167 < 6 + 7(2 - 7r)$



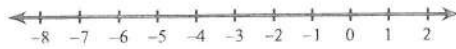
10)  $5(6 + 3r) + 7 \geq 127$



11)  $-8x + 2x - 16 < -5x + 7x$



12)  $-1 - 6x - 6 > -11 - 7x$



LESSON 6

LESSON 7

## INEQUALITIES WITH VARIABLES ON BOTH SIDES


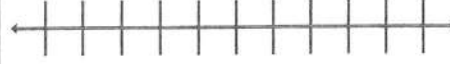

### STEPS TO SOLVE

1. \_\_\_\_\_ and/or \_\_\_\_\_ like terms (if necessary).
  2. Collect \_\_\_\_\_ on one side of the inequality sign.
  3. Collect \_\_\_\_\_ on the other side of the inequality sign.
  4. \_\_\_\_\_ the inequality.
- Describe when it is necessary to flip the inequality sign:

Practice solving the inequalities in the table below. In step 1, collect the variables on the same side of the inequality sign. In step 2, collect the constants on the other side. Then find the solution.

	$21x - 9 \geq 18x + 12$	$-5x + 14 > -9x + 2$	$25 - 7x \leq 3x + 50$
STEP 1			
STEP 2			
SOLUTION			

Solve the inequalities. Then choose a number in your solution set to check and sketch a graph.

1. $2(-3x + 1) < -5x + 14$	2. $19 + 9x \leq -(x - 41)$	3. $-4(3 + 3x) > 6(4 - x)$
✓ CHECK:	✓ CHECK:	✓ CHECK:
		

Solve each of the inequalities. Be sure to show all work.

4.  
 $55.2x - 75 > 29.7x + 52.5$

\_\_\_\_\_

5.  
 $22 - 3(3x + 1) \geq -x + 45$

\_\_\_\_\_

6.  
 $\frac{3}{7}(-21 + 14x) < 18x + 10.5 + x$

\_\_\_\_\_

7. Preston is playing a game where he must solve the inequality below and then throw a dart at the board. If his dart lands on a square with a value that is a solution to the inequality, he wins. Shade in any square that Preston could land on to win.

$$5(4 - x) > 2(-4x + 7)$$

10	-12	-3
-1	-2	-5
6	4	0

Write an inequality to solve each question below.

8. Jan needs to buy a backpack and several folders for school. If she shops at Smart Supply, the backpack will cost \$45 and folders cost \$0.45 each. If she shops at The Supply Guys, the backpack will cost \$50.40 and folders cost \$0.15 each. Write and solve an inequality to find the number of folders Jan would need to buy for The Supply Guys to be the cheaper option.

Inequality: \_\_\_\_\_

Solution: \_\_\_\_\_

9. Luna opened an account with \$50 and plans to deposit \$15 each week. On the same day, Mason opened an account with \$10 and plans to deposit \$25 each week. Write and solve an inequality to represent the number of weeks that Luna's account balance will be greater than or equal to Mason's.

Inequality: \_\_\_\_\_

Solution: \_\_\_\_\_

10. Jill's plant is 15 inches tall and grows 0.25 inches each week. Max's plant is 18 inches tall and grows 0.25 inches each week. At this rate, will Jill's plant ever be taller than Max's? Explain.

Summarize today's lesson:



## QUIZ: INEQUALITIES

Match each of the inequalities with their solution set. Show your work.

1.  $-9x + 13 < 31$

A.  $x > 2$

2.  $3.5x - 3 > -x + 6$

B.  $x < -2$

3.  $5(-2x + 3) + 15x < 5$

C.  $x > -2$

4.  $-2(7x - 4) > \frac{5}{2}(x - 10)$

D.  $x < 2$

### Answers

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

Use your knowledge of inequalities to answer each question below. Show your work.

5. What is the largest value of  $x$  that is not a solution to  $-(9x - 4) + 12 + 18x > 79$ ?

6. Which of the following is a solution to the inequality below?

$$12 - (x + 17) \leq 8(x + 3) - 15x$$

a.  $x = 5$

b.  $x = 6$

c.  $x = 4$

d.  $x = 4.9$

7. Jeremiah is going to the local arcade with \$32 in his wallet to spend. He plans to bowl one game and play some arcade games. A game of bowling costs \$11, the bowling shoe rental is \$3.75, and the arcade games cost \$0.75 each. Write and solve an inequality to find the number of arcade games Jeremiah can play.

Use your knowledge of inequalities to answer each question below.

8. Mrs. Dolores is shipping a package to her grandkids. The post office charges a shipping fee of \$9 plus \$0.50 per pound. Ship4U charges a shipping fee of \$6 plus \$0.80 per pound. Write and solve an inequality to find how much her package can weigh for Ship4U to be the cheaper option.

9. Write an inequality that describes all the solutions to  $3.5s + 4 - 10s + 19 \geq 31 - 0.5s + 10$ .

10. After Halloween, Corey and Jama count their candy stashes. Corey has 81 pieces and Jama has 95 pieces. Corey plans to eat 4 pieces a day and Jama will eat 6 pieces a day. Write and solve an inequality to find the the number of days Jama will have more candy than Corey.

# LITERAL EQUATIONS

The boxes at the right give examples and non-examples of literal equations. Based on your observations, what do you think makes something a literal equation?

**EXAMPLES:**

$$y = mx + b$$

$$A = bh$$

$$\frac{c + 5}{d} = 12$$

**NON-EXAMPLES:**

$$\frac{g - 11}{3} = 20$$

$$196 = 8w$$

$$3.5x - 4 = 10$$

**LITERAL EQUATIONS**

- A literal equation has more than one \_\_\_\_\_ and can be rearranged to solve for a specific \_\_\_\_\_.
- \_\_\_\_\_ are great examples of literal equations. List at least 3 literal equations that you have seen or used before:

Each table below gives a pair of equations. First, solve the equation on the left. Then use similar steps to solve the literal equation on the right for the specified variable in parentheses.

**A.**

$144 = 4b$	$d = ef$ (f)

**B.**

$13x + 9 = 100$	$mx + b = y$ (m)

**C.**

$360 = 5(12)(h)$	$V = lwh$ (h)

**D.**

$70 = 2(7) + 2n$	$h = mj + 2k$ (k)

**E.**

$75 = \frac{x}{2}$	$t = \frac{q}{r}$ (q)

**F.**

$144 + c^2 = 169$	$x^2 + y^2 = z^2$ (x)

Solve each equation below for the variable specified in parentheses.

<p>1. <math>I = prt</math> (t)</p> <p>_____</p>	<p>2. <math>8x + 4y = -12</math> (y)</p> <p>_____</p>	<p>3. <math>E = mc^2</math> (c)</p> <p>_____</p>				
<p>4. <math>ab + cd = e</math> (a)</p> <p>_____</p>	<p>5. Compare and contrast solving literal equations with equations containing one variable.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%; padding: 5px;">SIMILARITIES</th> <th style="width: 50%; padding: 5px;">DIFFERENCES</th> </tr> </thead> <tbody> <tr> <td style="height: 80px;"></td> <td style="height: 80px;"></td> </tr> </tbody> </table>		SIMILARITIES	DIFFERENCES		
SIMILARITIES	DIFFERENCES					

Apply your knowledge of solving literal equations to each problem below.

<p>6. The formula for the perimeter of a rectangle is <math>P = 2L + 2W</math>.</p> <p>a. Solve the equation for W.</p> <p>_____</p> <p>b. Use your equation to find the width of a rectangle that has a perimeter of 244 inches and a length of 59 inches.</p> <p>_____</p>	<p>7. The formula <math>F = \frac{9}{5}C + 32</math> can be used to convert degrees from Celsius to Fahrenheit.</p> <p>a. Solve the equation for C.</p> <p>_____</p> <p>b. Use your equation to find the temperature of a room in Celsius if it is <math>95^\circ F</math>.</p> <p>_____</p>
<p>8. The formula for finding the volume of a cone can be found using <math>V = \frac{1}{3}Bh</math>, where B is the area of the base and h is the height of the cone.</p> <p>a. Solve the equation for h. _____</p> <p>b. Mr. Trill tells his students the value of two variables in the equation are <math>2,198 \text{ cm}^3</math> and <math>314 \text{ cm}^2</math>. Explain how you can determine the value of each variable given this information.</p>	

## LITERAL EQUATIONS

Show all work as you solve each of the questions below.

<p>1. Mariko needs to solve the equation below for D. Which correctly describes the step he should take?</p> $M = \frac{D}{V}$ <p>a. Subtract V from both sides. b. Divide both sides by V. c. Multiply both sides by V. d. Divide both sides by D.</p>	<p>2. Katie needs to solve the equation below for b. Which correctly describes the first step?</p> $6a - 3b = 27$ <p>a. Subtract 6a from both sides. b. Add 3 to both sides. c. Subtract 6 from both sides. d. Divide both sides by -3.</p>	
<p>3. Solve the formula for m.</p> $y = mx + b$ <p>a. <math>m = y - (x + b)</math> b. <math>m = \frac{y - b}{x}</math> c. <math>m = \frac{y}{x} - b</math> d. <math>m = \frac{y}{b} - x</math></p>	<p>4. Solve the formula for y.</p> $-10x + 2y = 4$ <p>a. <math>y = 5x + 2</math> b. <math>y = 5x + 4</math> c. <math>y = 2 + 10x</math> d. <math>y = \frac{28}{x}</math></p>	<p>5. Solve the formula for c.</p> $ad + bc = 2$ <p>a. <math>c = \frac{2}{ad} - b</math> b. <math>c = \frac{2}{b} - ad</math> c. <math>c = b(2 - ad)</math> d. <math>c = \frac{2 - ad}{b}</math></p>
<p>6. The formula <math>d = rt</math> can be used to show the relationship between distance, rate and time. Solve the formula for t.</p> <p>_____</p>	<p>7. The formula <math>V = lwh</math> can be used to find the volume of a rectangular prism. Solve the formula for l.</p> <p>_____</p>	<p>8. The formula <math>P = \frac{F}{A}</math> can be used to relate pressure, force and area. Solve the formula for F.</p> <p>_____</p>
<p>9. Calvin is using the formula <math>A = 3r^2</math> to estimate the area of a circle.</p> <p>a. Solve the formula for r.</p> <p>_____</p> <p>b. Use your equation to estimate the radius of a circle with an approximate area of 300 cm<sup>2</sup>.</p> <p>_____</p>	<p>10. The formula <math>A = \frac{1}{2}bh</math> can be used to find the area of a triangle.</p> <p>a. Solve the formula for b.</p> <p>_____</p> <p>b. If the area of the triangle is 48 in<sup>2</sup>, what would be the appropriate units for the base?</p> <p>_____</p>	

# Literal Equations: Solve the Kiddle

Solve each problem for the variable specified. Find your answer in the table to the right and find its corresponding letter. Place the letter in the box to the left of the problem.

At the bottom, place each problem's letter on the blank line that shows the problem # for that letter.

1. Solve for a.  $a - f = g$
2. Solve for f.  $\frac{f}{a} = g$
3. Solve for g.  $ag + f = d$
4. Solve for f.  $fg - 3a = 4a$
5. Solve for d.  $ad - 8 - g = 9 + g$
6. Solve for b.  $abc + d = f$
7. Solve for g.  $\frac{1}{5}g + ab = d$
8. Solve for f.  $3af - 8b = 4g$
9. Solve for b.  $18 = \frac{bd}{2}$
10. Solve for c.  $ac + bd = f$

I'm lighter than a feather yet the strongest person can't hold me for more than six minutes.  
What am I?

ANSWER	CORRESPONDING LETTER
$\frac{fd}{ac}$	M
$f + g$	O
$\frac{9}{d}$	N
$\frac{7a}{g}$	B
$\frac{f - bd}{a}$	A
$5abd$	S
$ag$	T
$\frac{36}{d}$	R
$fg$	F
$\frac{f - d}{ac}$	E
$\frac{d - f}{a}$	H
$\frac{-fbd}{a}$	P
$5d - 5ab$	Y
$\frac{4bg}{a}$	D
$\frac{4g + 8b}{3a}$	R
$\frac{17 + 2g}{a}$	U
$\frac{df}{a}$	C

ANSWER:

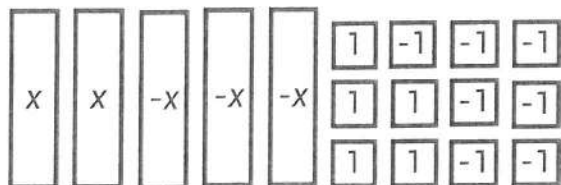
7 1 5 8 4 9 6 10 2 3

## EQUATIONS AND INEQUALITIES STUDY GUIDE

Solve each problem below. Be sure to ask questions if you need more help with a topic.

### I CAN SIMPLIFY ALGEBRAIC EXPRESSIONS.

1. Simplify an expression of the model.



2. Give an example of a like term for each of the terms listed below.

a.  $-19c$  \_\_\_\_\_

b.  $12$  \_\_\_\_\_

c.  $5x^2$  \_\_\_\_\_

d.  $2a$  \_\_\_\_\_

e.  $6xy$  \_\_\_\_\_

3. Simplify each expression.

a.  $-2(3x - 9)$  \_\_\_\_\_

b.  $5(12 - 5b)$  \_\_\_\_\_

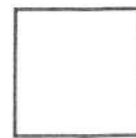
c.  $-8(-a + 10)$  \_\_\_\_\_

4. Simplify the expression.

$$10 - 0.5(12 - 8b) + b$$

\_\_\_\_\_

5. Simplify an expression for the perimeter of the square.



$$5.9x - 3.3$$

\_\_\_\_\_

### I CAN SOLVE LINEAR EQUATIONS INCLUDING THOSE WITH DISTRIBUTIVE PROPERTY.

6. Solve the equation.

$$\frac{2}{3}(9w - 24) = -10$$

7. Solve the equation:

$$-12c - 4 + 7.5c - 11 = -6$$

8. Solve the equation.

$$-11 + 1.5(2 - 6d) + 1.5d = 29.5$$

9. Yazmin noticed her favorite workout tops were on sale for \$6.00 off the original price. She purchased 4 of the tops and spent a total of \$51.80. Write and solve an equation to determine  $x$ , the original price of the workout tops.

\_\_\_\_\_

## I CAN SOLVE LINEAR EQUATIONS WITH VARIABLES ON BOTH SIDES.

10. Match each equation on the left with an equation on the right that shows the variables collected on one side and the constant terms collected on the other. Not all choices will be used.

\_\_\_\_\_ i.  $-10x + 32 = 2x + 8$

\_\_\_\_\_ ii.  $3.4x - x + 11 = 24 - 7.6x$

\_\_\_\_\_ iii.  $-4(x + 2) = -9x + 12$

a.  $12x = 24$

b.  $5x = 20$

c.  $10x = 13$

d.  $-12x = 40$

e.  $5x = 4$

11. Solve the equation.

$$16c - 79 = -24c + 49$$

12. Which value of b makes the equation true?

$$-0.8(10 - 35b) = -2b + 82$$

13. Solve the equation.

$$\frac{1}{4}(16a + 40) = -a + 5(a + 2)$$

14. At an ice cream shop, customers pay \$3.00 for a medium ice cream plus \$0.75 per topping. At a second ice cream shop, customers pay \$5.50 for a medium ice cream plus \$0.25 per topping. How many toppings would a customer have to order for the ice cream to cost the same at either shop?

15. The equilateral triangle and the square have the same perimeter.



$$1.5x + 12$$



$$2.5x + 10$$

a. What is the value of x? \_\_\_\_\_

b. What is the perimeter of each figure? \_\_\_\_\_

## I CAN SOLVE LINEAR INEQUALITIES WITH VARIABLES ON BOTH SIDES.

16. Solve the inequality. Represent the solution on the number line.

$$-2x + 4 > -5(4 + 2x)$$



17. Solve the inequality. Represent the solution on the number line.

$$10.7m - 11 \geq 1.9(5m + 10)$$



**I CAN SOLVE LINEAR INEQUALITIES WITH VARIABLES ON BOTH SIDES.**

18. Determine if each of the following are solutions to the inequality by writing "yes" or "no".

$$-3(9 - 4b) > 3(2b - 11)$$

- \_\_\_\_\_ a. -5  
 \_\_\_\_\_ b. 14  
 \_\_\_\_\_ c. -1

19. Determine if each of the following are solutions to the inequality by writing "yes" or "no".

$$-36n + 14 \leq 7(-5n + 3)$$

- \_\_\_\_\_ a. -7  
 \_\_\_\_\_ b. -8  
 \_\_\_\_\_ c. 0

20. Olivia's work is shown at the right. Explain the error that Olivia made and correct her solution.

$$\begin{aligned} 12 - 3(3x - 4) &> x + 14 \\ 9(3x - 4) &> x + 14 \\ 27x - 36 &> x + 14 \\ 26x &> 50 \\ x &> \frac{25}{13} \end{aligned}$$

**I CAN SOLVE LITERAL EQUATIONS FOR A SPECIFIED VARIABLE.**

21. The formula  $d = rt$  shows the relationship between distance, rate and time.

a. Solve the formula for  $r$ .

\_\_\_\_\_

b. Solve the formula for  $t$ .

\_\_\_\_\_

22. The formula  $D = \frac{m}{V}$  relates density, mass and volume.

a. Solve the formula for  $m$ .

\_\_\_\_\_

b. Solve the formula for  $V$ .

\_\_\_\_\_

23. Solve the formula for  $z$ .

$$4x + 8z = 2$$

\_\_\_\_\_

24. The formula  $A = \frac{1}{2}h(b_1 + b_2)$  can be used to find the area of a trapezoid.

a. Solve the formula for  $h$ .

\_\_\_\_\_

b. Use your equation to find the height of a trapezoid with bases of 10 cm, 8 cm and an area of  $81 \text{ cm}^2$ .

\_\_\_\_\_

25. The formula  $P = 2L + 2W$  can be used to find the perimeter of a rectangle.

a. Solve the formula for  $L$ .

\_\_\_\_\_

b. Use your equation to find the length of a rectangle with a perimeter of 60 inches and a width of 17 inches.

\_\_\_\_\_