

# MANEUVERING THE MIDDLE

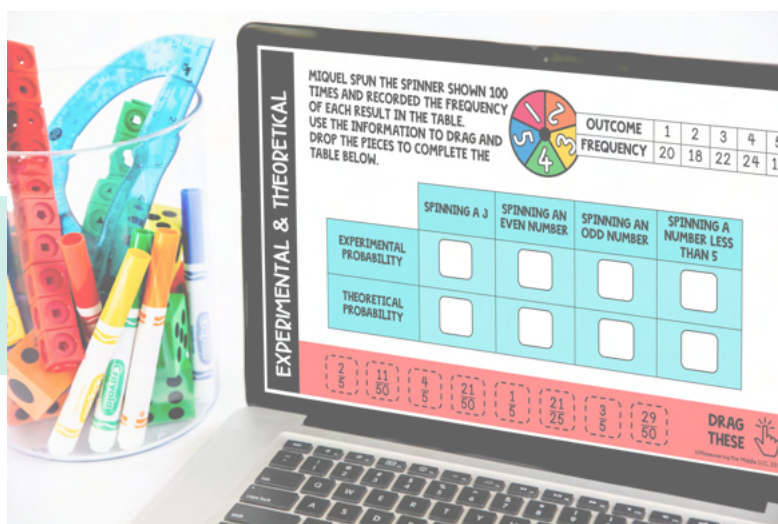
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# MANEUVERING THE MIDDLE

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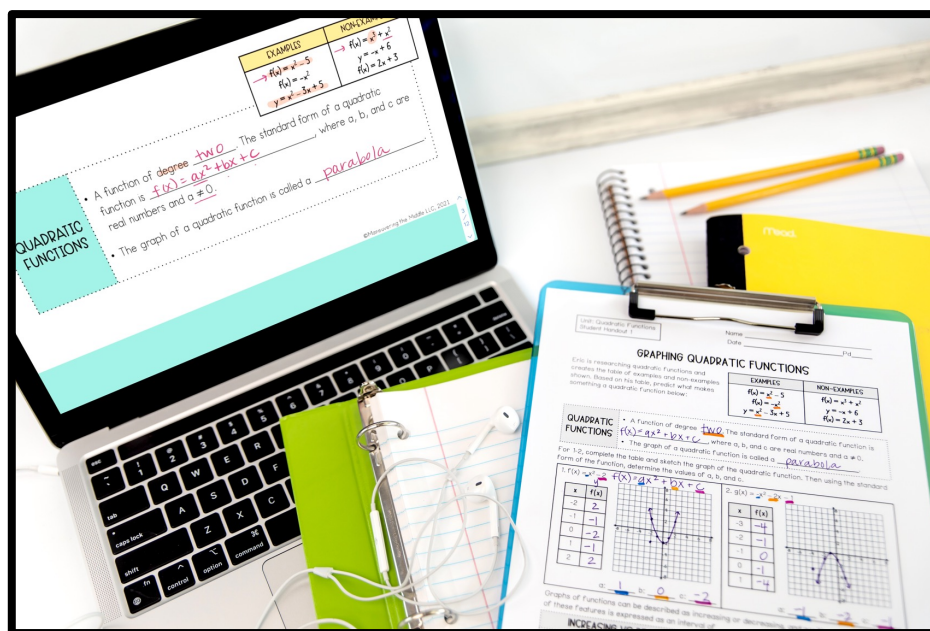
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- ✓ Supplemental Digital Components: digital activities, teaching slides, Google Form™ assessments
- ✓ Student Video Library: professional quality videos aligned to student handouts

## algebra 1 teks planning guide

A MANEUVERING THE MIDDLE® RESOURCE

### what is it?

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This resource has been designed to model the process presented in the math training, “A Step-by-Step Plan for Unfinished Learning”. Please use the information provided to jump start your planning for the school year.

### how does it work?

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A planning guide has been included for each of the key topics in Unit 1: Equations and Inequalities. Each guide will help you prepare for formative assessment opportunities, common student misconceptions, instructional strategies you can use to reach your students and suggestions for utilizing activities to best support your students’ needs.

PAGE	TOPIC	RESOURCE
5	Simplifying Expressions	Planning Guide
7	Solving Equations and Inequalities	Planning Guide
9	Simplifying Expressions	Maze Activity
14	Solving Equations	Scavenger Hunt Activity

### learn more about All Access

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The hands-on activities included are a brief sample of one element of our All Access membership. All Access is math curriculum designed to meet students’ needs and empower teachers. You can find out more by clicking the link below.

[maneuveringthemiddle.com/math-curriculum](https://maneuveringthemiddle.com/math-curriculum)

# simplifying expressions

## goal

Students should be able to simplify expressions by combining like terms and using the distributive property.

## prior skills

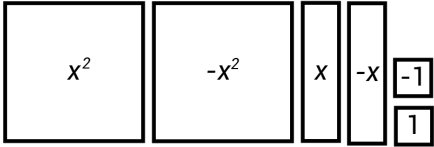
In previous grades, students identified and combined like terms.

## related materials

- Unit 1, Student Handout 1
- Unit 1, Student Handout 2

	identifying like terms	simplifying by combining like terms	simplifying by distributing												
formative assessments	<table><thead><tr><th>TERMS</th><th>LIKE OR UNLIKE?</th></tr></thead><tbody><tr><td><math>-3c</math> and <math>5c^2</math></td><td></td></tr><tr><td><math>\frac{1}{4}</math> and <math>20</math></td><td></td></tr><tr><td><math>8.5x</math> and <math>8.5y</math></td><td></td></tr><tr><td><math>100p</math> and <math>-p</math></td><td></td></tr></tbody></table> <p>student handout 1</p>	TERMS	LIKE OR UNLIKE?	$-3c$ and $5c^2$		$\frac{1}{4}$ and $20$		$8.5x$ and $8.5y$		$100p$ and $-p$		<div><math display="block">-x + 6y - 9x - 2y - 4y</math><p>student handout 1</p></div> <div><math display="block">-4\frac{1}{2}x + 15 + \frac{7}{2}x - 23</math><p>student handout 1</p></div>	<div><math display="block">\frac{3}{4}(16m - 5) - \frac{3}{2}</math><p>student handout 2</p></div> <div><math display="block">14 - 6(3x - 1.5)</math><p>student handout 2</p></div>		
	TERMS	LIKE OR UNLIKE?													
$-3c$ and $5c^2$															
$\frac{1}{4}$ and $20$															
$8.5x$ and $8.5y$															
$100p$ and $-p$															
common misconceptions	<p>Students may identify terms with the same variable but different exponents as like terms (ex. 1) or terms with the same coefficient as like terms (ex. 2).</p> <table><thead><tr><th>example 1</th><th>example 2</th></tr></thead><tbody><tr><td><math>-3c</math> and <math>5c^2</math></td><td><math>8.5x</math> and <math>8.5y</math></td></tr></tbody></table>	example 1	example 2	$-3c$ and $5c^2$	$8.5x$ and $8.5y$	<p>Students may not include the sign in front of a term (ex. 1) or may use inverse operations to combine like terms because of previous experience solving equations (ex. 2).</p> <table><thead><tr><th>example 1</th><th>example 2</th></tr></thead><tbody><tr><td><math display="block">\begin{array}{r} 5x + 12 - 8x \\ 13x + 12 \end{array}</math></td><td><math display="block">\begin{array}{r} 14y + 3 + 9y \\ -9y \quad -9y \\ \hline 5y + 3 \end{array}</math></td></tr></tbody></table>	example 1	example 2	$\begin{array}{r} 5x + 12 - 8x \\ 13x + 12 \end{array}$	$\begin{array}{r} 14y + 3 + 9y \\ -9y \quad -9y \\ \hline 5y + 3 \end{array}$	<p>Students may only distribute to the first term inside parentheses (ex. 1) or may incorrectly apply integer rules with multiplication (ex. 2)</p> <table><thead><tr><th>example 1</th><th>example 2</th></tr></thead><tbody><tr><td><math display="block">\begin{array}{r} -5(2x - 3) \\ -10x - 3 \end{array}</math></td><td><math display="block">\begin{array}{r} -5(2x - 3) \\ -10x - 15 \end{array}</math></td></tr></tbody></table>	example 1	example 2	$\begin{array}{r} -5(2x - 3) \\ -10x - 3 \end{array}$	$\begin{array}{r} -5(2x - 3) \\ -10x - 15 \end{array}$
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# simplifying expressions

	identifying like terms	simplifying by combining like terms	simplifying by distributing
instructional strategies	<p><b>model it:</b> allow students time to explore the idea of like and unlike terms with a concrete example such as algebra tiles</p> 	<p><b>organize it:</b> encourage students to color code like terms or put a unique shape around like terms as a first step</p> <p><b>organize it:</b> encourage students to highlight or underline the coefficient of variable terms before combining to avoid errors such as forgetting the sign or thinking that a stand-alone variable has a coefficient value of 1</p> $3x - 12 + x + 19$	<p><b>picture it:</b> use an area model or the box method to demonstrate the distributive property</p> $6(2x - 4) \rightarrow 6 \begin{array}{ c c } \hline 2x & -4 \\ \hline 12x & -24 \\ \hline \end{array}$
extra practice and resources	<p>Write a term of your choice on the board. Then, allow students to generate their own examples and non-examples of like terms with the term you provided. Consider allowing students to use dry erase boards to show their responses.</p>	<p><b>Simplifying Expressions Maze Activities*</b></p> <p>Consider the differences in the maze activities to differentiate and choose the maze that best meets the needs of your students:</p> <ul style="list-style-type: none"> <li><b>Maze #1:</b> The first maze in the activity practices simplifying expressions with 3-4 terms but does not include the distributive property.</li> <li><b>Maze #2:</b> The second maze includes expressions that require both distributing and combining like terms.</li> </ul>	

\*Simplifying Expressions Maze Activities are included in this PDF on pages 9-13.



# solving equations and inequalities

## goal

Students should be able to solve linear multi-step equations and inequalities with variables on both sides.

## prior skills

In previous grades, students solved equations with variables on both sides and inequalities with variables on one side.

## related materials

Unit 1, Student Handouts 3-8

	solving multi-step equations and inequalities	solving equations and inequalities with variables on both sides								
formative assessments	<div><math display="block">-(2x + 5) + 14 = 22</math><p>student handout 3</p></div> <div><math display="block">-2x + 6(x - 8) + 10 &lt; 2</math><p>student handout 6</p></div>	<div><math display="block">5(k + 14) = \frac{1}{5}(20k - 80)</math><p>student handout 4</p></div> <div><math display="block">\frac{3}{7}(-21 + 14x) &lt; 18x + 10.5 + x</math><p>student handout 7</p></div>								
common misconceptions	<p>Students may combine a like term with the constant in front of the parentheses before distributing (ex. 1) or make errors when distributing, especially with integers (ex. 2).</p> <table><tr><th>example 1</th><th>example 2</th></tr><tr><td><math display="block">2 + 4(5 - 3x) = 100</math><math display="block">6(5 - 3x) = 100</math></td><td><math display="block">-(-3x + 12) - 8 &gt; 18</math><math display="block">3x + 12 - 8 &gt; 18</math></td></tr></table>	example 1	example 2	$2 + 4(5 - 3x) = 100$ $6(5 - 3x) = 100$	$-(-3x + 12) - 8 > 18$ $3x + 12 - 8 > 18$	<p>Students may use incorrect inverse operations when solving equations with rationals, especially when the coefficient is a fraction (ex. 1), or may struggle to remember when to flip the inequality symbol (ex. 2).</p> <table><tr><th>example 1</th><th>example 2</th></tr><tr><td><math display="block">-18 = \frac{1}{2}x</math><math display="block">-9 = x</math></td><td><math display="block">2.5x \geq -12.5</math><math display="block">x \leq -5</math></td></tr></table>	example 1	example 2	$-18 = \frac{1}{2}x$ $-9 = x$	$2.5x \geq -12.5$ $x \leq -5$
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$2 + 4(5 - 3x) = 100$ $6(5 - 3x) = 100$	$-(-3x + 12) - 8 > 18$ $3x + 12 - 8 > 18$									
example 1	example 2									
$-18 = \frac{1}{2}x$ $-9 = x$	$2.5x \geq -12.5$ $x \leq -5$									

# solving equations and inequalities

	solving multi-step equations and inequalities	solving equations and inequalities with variables on both sides
instructional strategies	<p><b>rephrase it:</b> instead of only instructing students to “solve” an equation, considering asking “which value makes the equation true” to reinforce the goal in solving as well as the fact that students can check their solutions after solving</p> <p><b>organize it:</b> encourage students to pause and become familiar with the equation before jumping in to solve; model the habit of looking for opportunities to “clean up” one side of the equation by combining like terms and distributing first</p>	<p><b>model it:</b> use algebra tiles as a concrete way to introduce solving basic equations with variables on both sides before moving on to more complicated equations</p> <p><b>organize it:</b> draw a line through the equal sign to separate the two sides of the equation</p> <p><b>rephrase it:</b> have students summarize real-world equation and inequality situations with words before using variables and symbols</p>
extra practice and resources	<p><b>Solving Multi-Step Equations Solve and Color*</b></p> <p>This activity may be especially beneficial for struggling students as it allows practice with the following skills:</p> <ul style="list-style-type: none"> <li>• Solving two-step equations (A, B, F, H, I, L, N, P)</li> <li>• Solving equations involving the distributive property (D, G, K, O)</li> <li>• Solving equations involving combining like terms (C, E, J, M)</li> </ul>	<p><b>Solving Equations Scavenger Hunt**</b></p> <p>Consider using the scavenger hunt in two different ways. First, as a traditional scavenger hunt to promote movement and collaboration. Secondly, as a set of cards that can be scaffolded in a small group setting. The skills practiced on each card included in the scavenger hunt are listed below:</p> <ul style="list-style-type: none"> <li>• Variables on one side of the equation (Card A)</li> <li>• Variables on both sides (Cards C and J)</li> <li>• Variables on both sides and combining like terms (Card H)</li> <li>• Variables on both sides and distributing (Cards B, D, E, F, G, I)</li> </ul>

\*Solving Multi-Step Equations Solve and Color is included as a part of the Algebra 1 All Access Membership.

\*\*Solving Equations Scavenger Hunt is included in this PDF on pages 14-23.



# SIMPLIFYING EXPRESSIONS

## maze activity

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Students will be able to simplify expressions by combining like terms with and without distributing.



A.5A\* Students will solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides

\*While simplifying expressions is not stated in the standard, it is a prerequisite skill to solving multi-step linear equations in which simplifying and combining like terms is necessary

**Ideas for Implementation:** This activity assesses a student's ability to simplify expressions. There are two different mazes included:

1. Maze #1 practices combining like terms without distributing
2. Maze #2 practices combining like terms with distributing

### Instructions:

1. Print and copy a maze (or both mazes) for each student.
2. Students will solve each problem. The correct answers will lead them correctly to the finish.

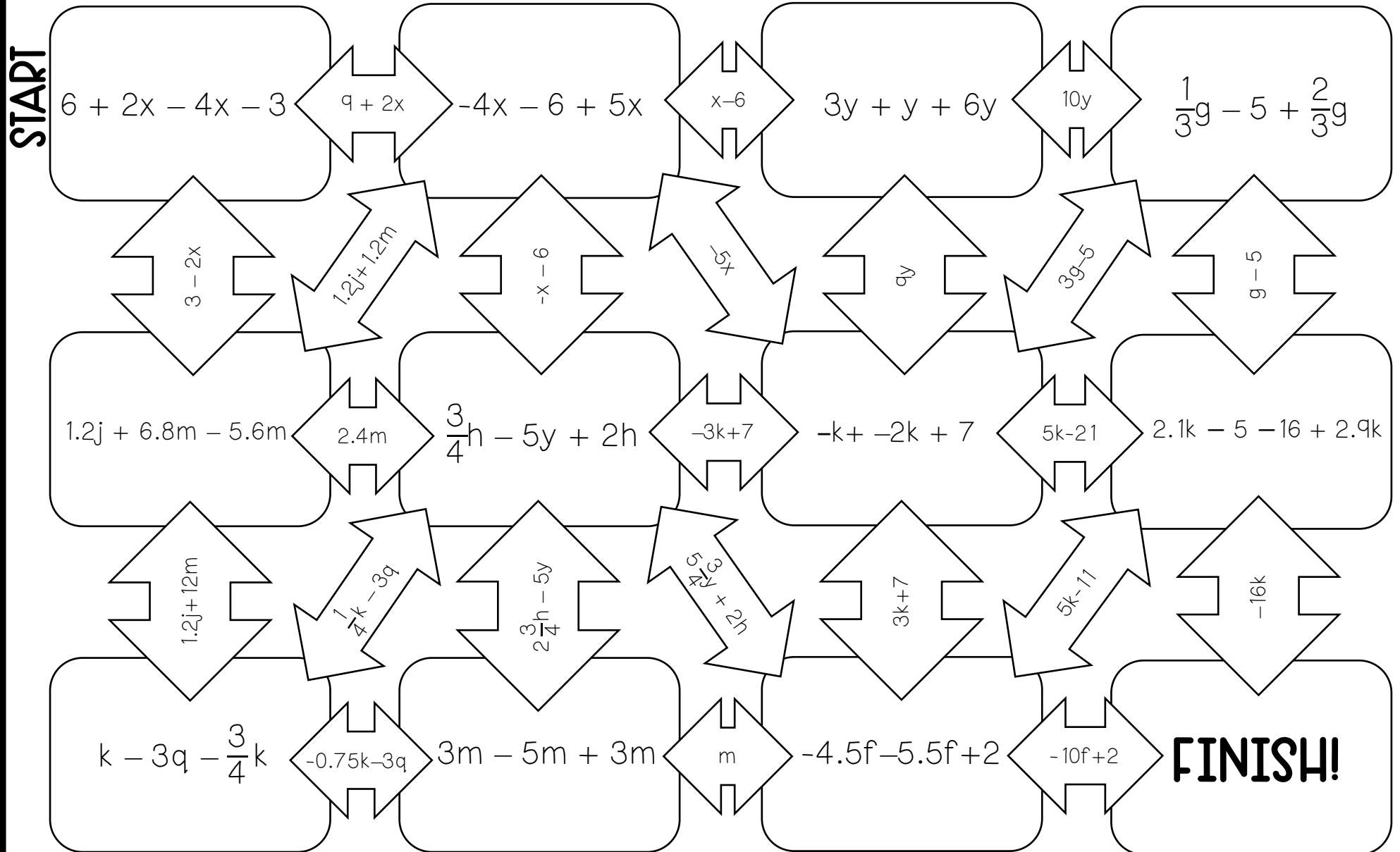
**Notes:** I normally have students shade the path with a highlighter or colored pencils for easy grading. This activity is best used as an individual assessment and is great for early finishers.

# SIMPLIFYING EXPRESSIONS

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Pd: \_\_\_\_\_

maze #1

**Instructions:** Follow the correct simplified expression of each problem to make it through the maze. Shade or color your path as you go.



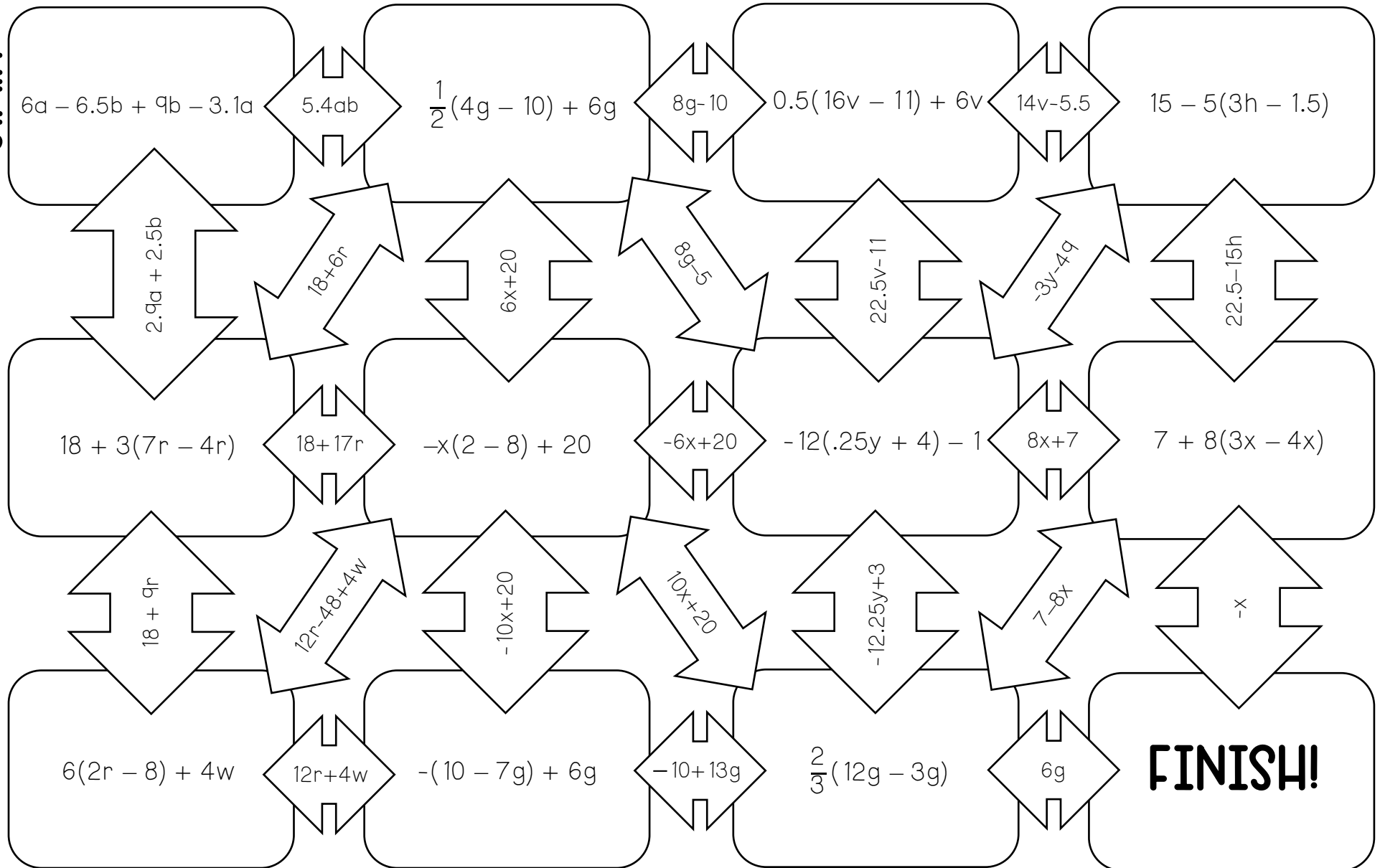
# SIMPLIFYING EXPRESSIONS

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Pd: \_\_\_\_\_

## maze #2

Instructions: Follow the correct simplified expression of each problem to make it through the maze. Shade or color your path as you go.

START



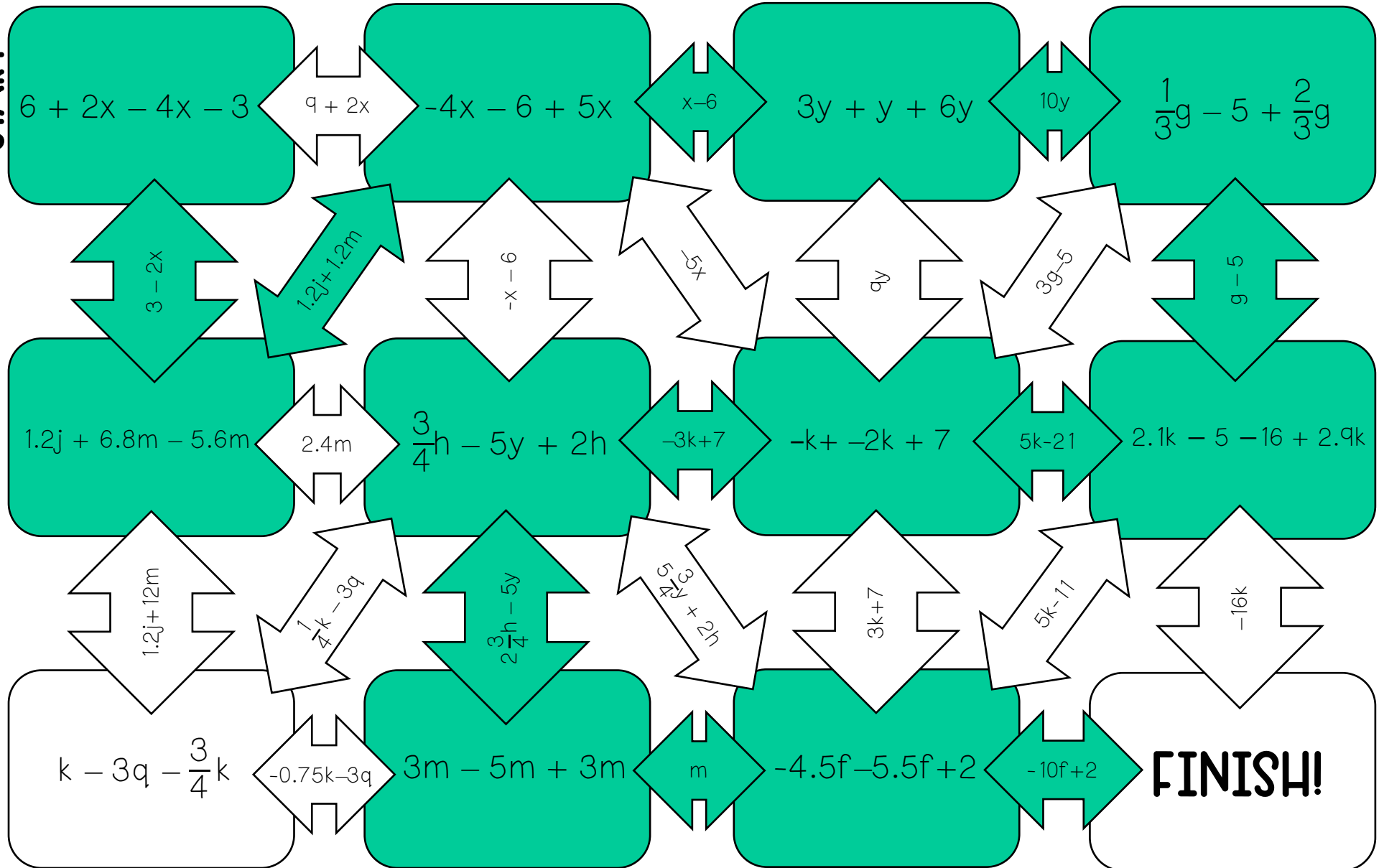
# SIMPLIFYING EXPRESSIONS

Name: \_\_\_\_\_ Key \_\_\_\_\_ Date: \_\_\_\_\_ Pd: \_\_\_\_\_

maze #1

Instructions: Follow the correct simplified expression of each problem to make it through the maze. Shade or color your path as you go.

START



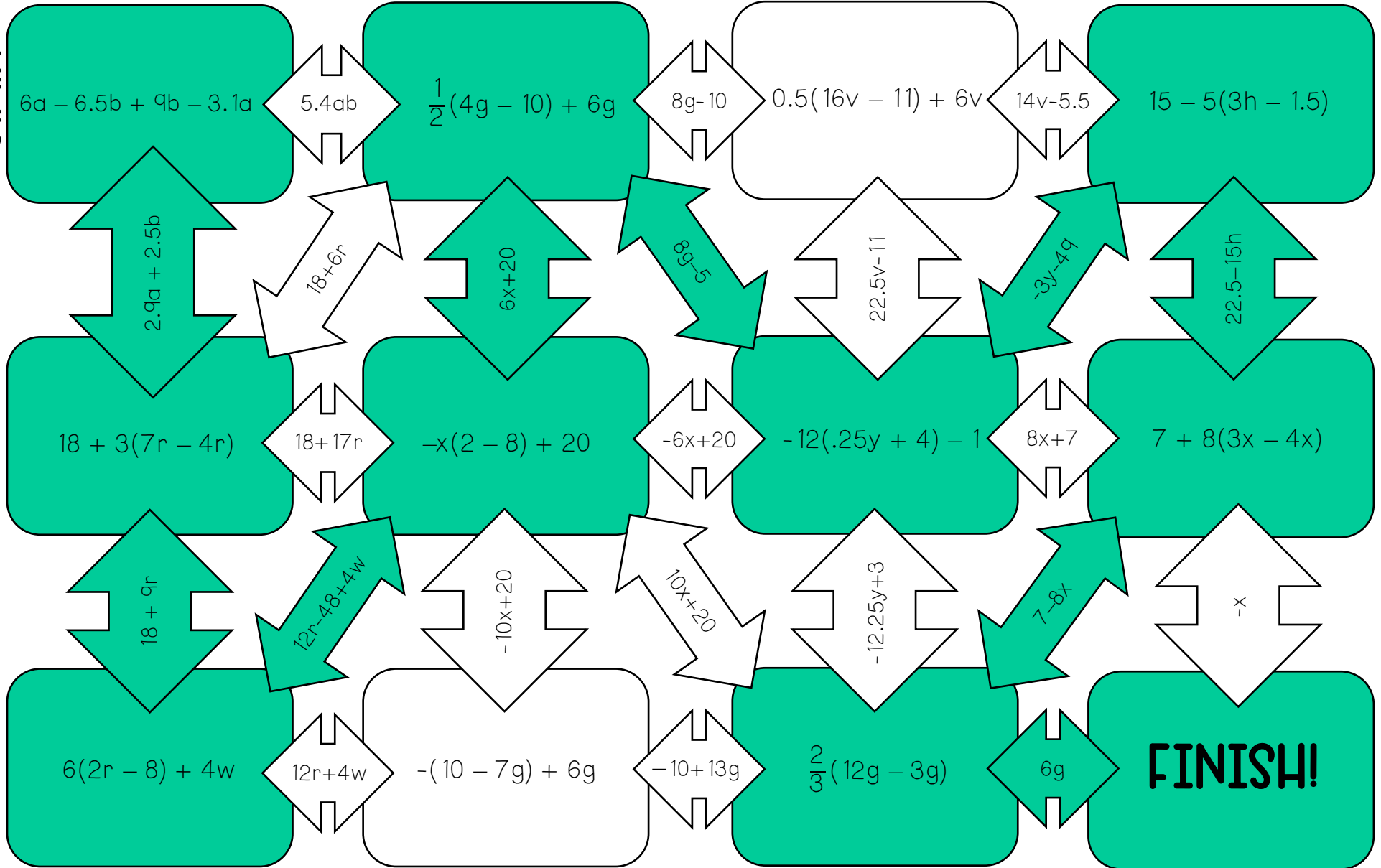
# SIMPLIFYING EXPRESSIONS

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Pd: \_\_\_\_\_

## maze #2

**Instructions:** Follow the correct simplified expression of each problem to make it through the maze. Shade or color your path as you go.

# START



# SOLVING EQUATIONS

## scavenger hunt

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Students will be able to solve one variable equations, including those with the distributive property and variables on both sides.



A.5A solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides

**Ideas for Implementation:** Math scavenger hunts are an awesome way to get students out of their seats and working. They're also super easy to prep and facilitate for the teacher! Students love being able to get up and move around the classroom and are more engaged than with a worksheet.

### Directions:

1. Print each problem page on card stock and laminate if possible.
2. Post the pages around the room/hall/library.
3. Students receive a recording sheet to show their work in the appropriate box.
4. Students begin at any letter and work that problem. They then look for the solution at the top right of another card. Once the solution is found, students work the problem on the card.
5. Students continue until they end up at the card where they began.

### Teacher Tips:

1. If you have a class set of clip boards or dry erase boards, it will be easier for students to write.
2. This activity works best in pairs or groups of three so that students can discuss with one another.

# A

$$X = -3$$

What value of  $x$  makes the following equation true?

$$3x - 19 + 4x + 9 = 32$$

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# B

$$X = 1$$

Find the solution to the following equation.

$$6.6(x + 4) = 5.1(2x - 4)$$

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# C

$$x = -5.4$$

What value of  $x$  makes the following equation true?

$$3.4x - 7.2 = 5.8x + 24$$

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# D

$$x = 75$$

Find the solution to the following equation.

$$4(x - 1) + 11.1 = .7(x - 4)$$

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**E**

$$X = -.8$$

What value of  $x$  makes the following equation true?

$$\frac{2}{3}(x - 9) = \frac{1}{3}x + 19$$

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**F**

$$X = 6$$

Find the solution to the following equation.

$$5.6x + 18 - 1.3x = .9(x - .4)$$

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# G

$$x = 16$$

What value of  $x$  makes the following equation true?

$$8(3x + 4) - 16x = 40$$

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# H

$$x = 13$$

Find the solution to the following equation.

$$5x + 7 - x - 2 = 6x + 3x - 16$$

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# I

$$x = -13$$

What value of  $x$  makes the following equation true?

$$\frac{3}{4}(x - 16) = \frac{5}{4}(2x - 32)$$

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# J

$$x = 4.2$$

Find the solution to the following equation.

$$54x + 80 = 24x + 56$$

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# SOLVING EQUATIONS SCAVENGER HUNT

Show all your work in the appropriate box below.

A

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

B

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

C

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

D

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

E

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

F

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

G

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

H

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

I

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

J

Solution: \_\_\_\_\_ Next Card: \_\_\_\_\_

## SOLVING EQUATIONS SCAVENGER HUNT

Show all your work in the appropriate box below.

A

Solution:  $x = 6$  Next Card: F

B

Solution:  $x = 13$  Next Card: H

C

Solution:  $x = -13$  Next Card: I

D

Solution:  $x = -3$  Next Card: A



E

Solution:  $x = 75$  Next Card: D

F

Solution:  $x = -5.4$  Next Card: C

G

Solution:  $x = 1$  Next Card: B

H

Solution:  $x = 4.2$  Next Card: J

I

Solution:  $x = 16$  Next Card: G

J

Solution:  $x = -.8$  Next Card: E