Name: _____ Packet Due Date: _____

In-Class Workbook

Expressions and Equations:

Unit 4 – Part 1: Solving Equations and Inequalities

How do we use patterns to understand mathematics and model situations?

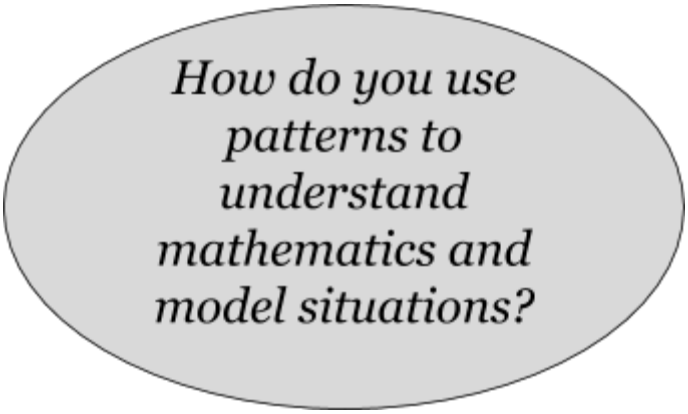
Standard	Description
7.EE.A.1	➔ Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.A.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
7.EE.B.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problems, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Packet Completion Rubric				
4	**3**	**2**	**1**	**0**
Workbook demonstrates significant effort. Student utilizes notes to help extend their thinking, writing questions, comments or reactions to the content.	Workbook demonstrates some effort. Student takes notes but could further understanding by questioning and interacting with the material.	Workbook shows little effort. Student takes notes sporadically, and could benefit from greater consistency with the material.	Workbook shows little to no effort. Student does not take notes and must demonstrate future interaction with the material to aid understanding.	Workbook is entirely incomplete or not turned in.

Grading Breakdown: 3.5 - 4 = A 3 - 3.4 = B 2.5 - 2.9 = C 2 - 2.4 = D 0 - 1.9 = F

*I am a person who believes in **asking questions**, in not conforming for the sake of conforming. I am deeply dissatisfied - about so many things, about injustice, about the way the world works - and in some ways, my dissatisfaction drives my storytelling.*
Chimamanda Ngozi Adichie

Unit 4 Part 1 Guiding Question:



Lesson Objectives	
Lesson After completing a lesson, check the box	**I can…** After completing each lesson, you are on the right track if you can confidently state "I can…"
❑ 4.1	Define key vocabulary in mathematical expressions
❑ 4.2	Combine like terms to create equivalent expressions
❑ 4.3	Solve one-step equations
❑ 4.4	Solve one-step equations

Lesson

4.1

DO-NOW

```
1 chicken sandwich
1 chicken biscuit
1 coke
1 sprite
1 chicken biscuit
1 chicken biscuit
2 chicken strips
3 chicken sandwiches
1 chicken strips
2 fries
1 sprite
5 biscuits
```

You text all your friends and say you are picking up Popeyes for them today! You have saved up some money and wanted to bring them lunch for being awesome.

YOUR TASK: *What is the easiest way to put in this order at Popeyes? Explain!*

_____

_____

_____

_____

_____

_____

Homework Reminder

This is where you will shade in the box if you turned in your homework.
There is no homework due today! :)
"Excellence is not an art. It is the habit of practice." - Aristotle

Check-In

How are you doing today?

What do you wonder about algebra?

What do you know about algebra?

What is Algebra?

Algebra uses _____ and other symbols to describe quantities in _____, _____, and _____.
These letters are referred to as _____.

Video Takeaway:

Match the proper example to the proper term by drawing a line between them...

5 + 7	13x - 24	2x + 7	3 + 101
Algebraic Expression	Algebraic Expression	Expression	Expression

Expressions

An expression is a mathematical phrase that can contain _____, _____, and _____.

Each part of an expression (and equation) is called a _____

For example: **-6x + 12**
There are **2 terms:**
-6x and 12

Use the expression below to label the various parts of the expression.

$$-6x + 12$$

Expanded Form	***Standard Form***
EX:	*EX:*

Coefficients VS. Constants VS. Variables

$$8x - 5$$

Coefficients- numbers multiplied by variables	**Variables**- letters representing a value that may change	**Constants**- numbers standing alone that do not change

You Try!

$$12x - 4 + y - 2w$$

Is this an expression or an equation? _____

So, will we simplify or solve? _____

Coefficients-	Constants-	Variables-

Expressions from Expanded to Standard Form	
We ***simplify*** expressions by COMBINING LIKE TERMS!	**ONLY LIKE TERMS CAN BE COMBINED!**
• **Terms** can be classified as _____ or _____, and expressions can be simplified by combining like terms. • ***Like terms*** must have the same _____.	***Example:*** 7x and 9x are ***like*** terms 4d and 4g are ***not like*** terms
The Robinson family ordered snacks at the State Fair. They bought the following drinks (d), pizza (p), and ice cream cones (c).	

Write an expression to represent their purchases:

Simplify the expression by combining like terms:

5 + 3x + 2y + 3y + 7 + 3x + -1 + -5y + -10x +7y

LIKE TERMS:

X terms	Y terms	Constants

*Combine (add together) each group of **like terms**, above, to write the simplified version of the expression.*

Write your simplified version in the box below.

Let's Try!

1. $3x + 14y + 7x + 9x + 1 + y$

Is this an ***equation*** or an ***expression***? _____ Why? _____

Like Terms

Combine and Simplify: _____

2. $15y + 6x + 8 - 5y$

Is this an equation or an expression? _____ Why? _____

Like Terms

Combine and Simplify: _____

Rewrite 5x + 3x by combining like terms:	***Rewrite 5x - 3x by combining like terms:***

$7a - 6 + 8a$	$14b + 6b - 12$	$20c + 8d + 10c - 5d$

REMEMBER:

To have a simplified expression ALL like terms must be combined!

Guided Practice

Equation or Expression

(Circle equation or expression)

1. x + 3 **Equation or Expression**	2. 3x + 3 + 4y = 45 **Equation or Expression**
3. x + 3 = 7 **Equation or Expression**	4. 4s + 3 - 5 **Equation or Expression**
5. You simplify a _____ **Equation or Expression**	6. You solve a _____ **Equation or Expression**

Circle, Underline, or Place a BOX around Like Terms

1. 4x + x + 3 + 2x + 6	2. 5y - 4x + 11 + 11y
3. 7s + 1 + 9s - 12x - 1	4. 7j + y + j + 12 - 12y

Combine Like Terms in these Algebraic Expressions

Remember to Add up Like Terms and Remember the Rules of Adding and Subtracting Rational Numbers

1. 6x + 5 + 2y - 5x + 3 Like Terms: _____ Like Terms: _____ Like Terms: _____ Simplified expression _____	2. x - y + 2x - 2 + 3y + 3 + 2y - x Like Terms: _____ Like Terms: _____ Like Terms: _____ Simplified expression _____	3. 2 + 2s + 5x + 2x + 11s + 10 Like Terms: _____ Like Terms: _____ Like Terms: _____ Simplified expression _____

Lesson 4.2 DO-NOW

Find the greatest common factor (GCF) of the following pairs of numbers:

24 and 18

9 and 20

Example: 12 and 16

Homework Reminder

Shade in the box if you turned in your homework.
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Check-In

How are you doing today?

What do you wonder about algebra?

Simplify using order of operations - PEMDAS

6 (3 + 9)	5 (9 + 2)	2 (8 - 4)
How is this expression different?	7 (x + 2)	Brainstorm how this expression could be expanded!

Distributive Property- Creating Equivalent Expressions

The distributive property allows the _____ outside of the parentheses to be _____ to the terms inside the parentheses.

EXAMPLE: ***3(2 + 7)***	***EXAMPLE:*** ***3(x + 7)***

Distributive Property-	
Each of the four members of the Robinson family ordered a drink (d), two slices of pizza (p), and an ice cream cone (c).  	*Distribute and write an expression to represent their order:*

Distribute a Negative - Be Mindful!		
-5(2x + 9)	-1/2(6t + 2)	-3(-4a – 2)

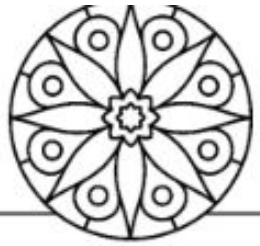
Factoring - Creating Equivalent Expressions	
Expressions can be _____ to remove the common factor. **This is how we "_____" the distributive property.**	
1. Determine the greatest common factor between the values *2. Remove the greatest common factor by dividing each term by it, and put it in front of the factored expression in parentheses*	Example: **6x + 15**

Factoring - Let's Try it!		
6a + 2	-24x - 9	10x + 35

Guided Practice

Name _____ Date _____

Greatest Common Factor Coloring



For each question, there is one correct answer and a color associated with that answer. On the coloring page, each ***question number*** *section should be filled in with that color!*

1

Rewrite the expression using the GCF times the sum of two numbers.

18 • 15

2(9 • 8) PINK	3(6 • 5) RED	4(4 • 5) PURPLE

2

Rewrite the expression using the GCF times the sum of two numbers.

20 • 50

2(10 • 25) DARK BLUE	5(4 • 10) ORANGE	10(2 • 5) PINK

3

Rewrite the expression using the GCF times the sum of two numbers.

66 • 44

2(33 • 22) ORANGE	3(22 • 14) RED	22(3 • 2) DARK BLUE

4

Rewrite the expression using the GCF times the sum of two numbers.

32 • 27

1(32 • 27) DARK GREEN	2(16 • 14) PURPLE	3(11 • 9) ORANGE

5

Rewrite the expression using the GCF times the sum of two numbers.

12 • 84

2(6 • 42) BLACK	12(1 • 7) ORANGE	6(2 • 14) LIGHT GREEN

6

Rewrite the expression using the GCF times the sum of two numbers.

40 • 56

8(5 • 7) PURPLE	2(20 • 28) LIGHT BLUE	4(10 • 14) ORANGE

7

Rewrite the expression using the GCF times the sum of two numbers.

56 • 91

14(4 • 7) PINK	7(8 • 13) LIGHT GREEN	4(14 • 23) LIGHT BLUE

8

Rewrite the expression using the GCF times the sum of two numbers.

25 • 55

25(1 • 2) DARK GREEN	11(5 • 5) PURPLE	5(5 • 11) YELLOW

9

Rewrite the expression using the GCF times the sum of two numbers.

30 • 84

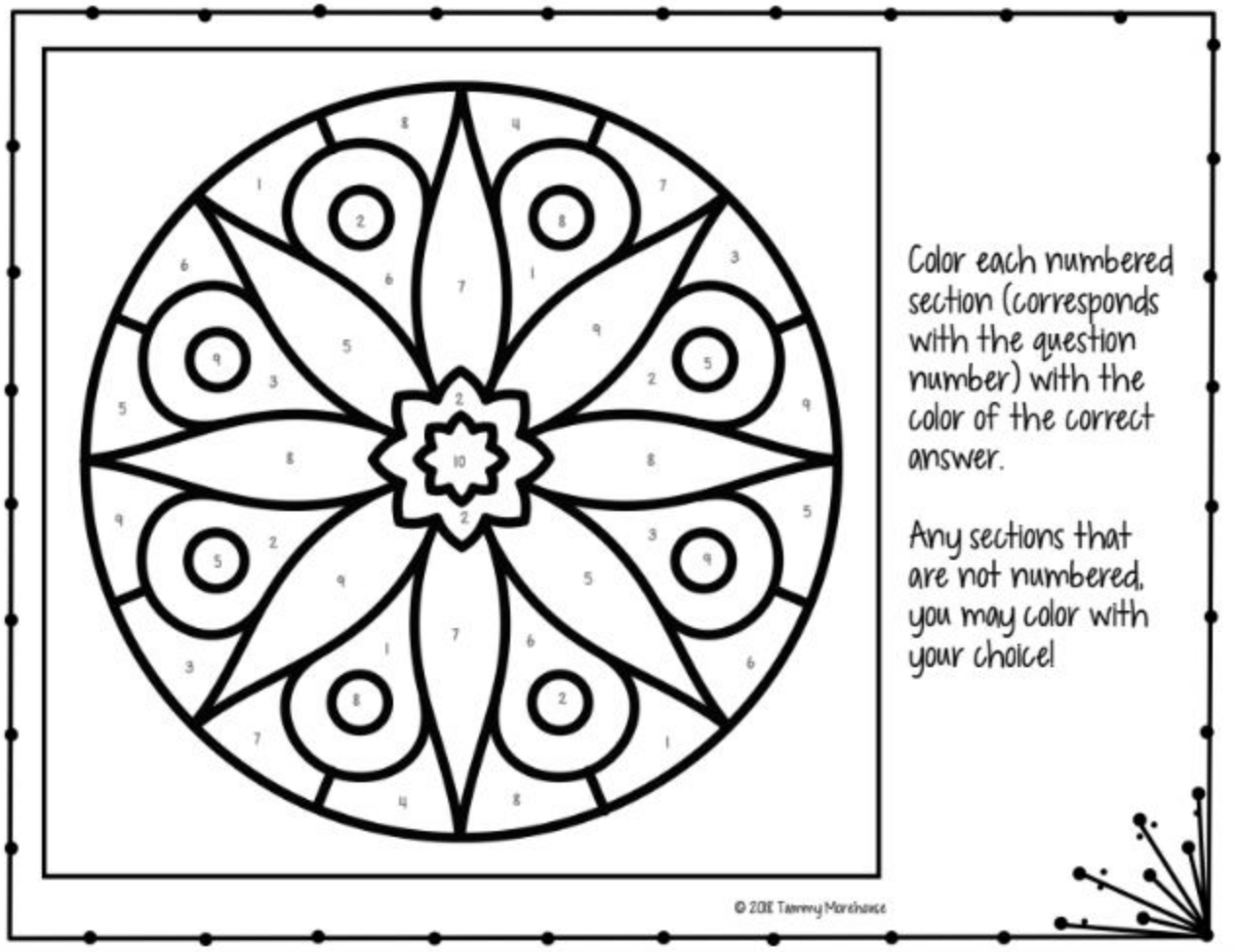
5(6 • 14) PINK	6(5 • 14) LIGHT BLUE	15(2 • 6) YELLOW

10

Rewrite the expression using the GCF times the sum of two numbers.

77 • 22

2(38 • 11) BROWN	7(11 • 2) ORANGE	11(7 • 2) RED



Show ALL your work. Check each problem with distribution.		1.
2.	3.	4.
5.	6.	7.
8.	9.	10.

Lesson **4·3** **DO-NOW**		What is the value of the unknown (x) in this picture? x = _____ Explain how you got your answer.
Homework Reminder	Shade in the box if you turned in your homework. ***"Excellence is not an art. It is the habit of practice." - Aristotle***	
Check-In	How are you doing today? What do you wonder about algebra?	

EXPRESSION VS. EQUATION

Identifying Missing Information	
Solving equations using variables involves skills that you **already know** how to accomplish. Don't believe me? See if you can identify the missing information in the boxes to the right.	1. ____ + 7 = 24 2. 32 ÷ ____ = 8 3. 4 * ____ = 48 4. ____ - 102 = 79

What does it mean to "solve" an equation?
Take the following equation: x + 7 = 12 *What does it mean to "solve" this equation?* To solve this equation means that we _____ of the variable. In this case, x = _____
Think of an equation like a balanced scale. We must always ensure that the scale stays balanced, or equal, to ensure our equation remains true.

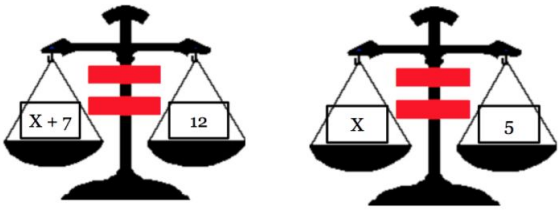
When two quantities are _____, we say that they are _____.

When solving equations, our goal will be to rewrite our equations so that:

1. The variable is on its _____ of the equals sign.

$X = 5$ **instead of** $X + 7 = 12$

2. We keep the equation _____.



Solving One-Step Equations Video Notes

Solving One-Step Equations - Let's Practice!

$x + 13 = 20$	$x - 3 = 2$
$9 = x + 4$	$25 = x - 6$

Inverse Operations

For **ADDITION**	**the inverse operation is...**	
For **SUBTRACTION**	**the inverse operation is...**	
For **MULTIPLICATION**	**the inverse operation is...**	
For **DIVISION**	**the inverse operation is...**	

	x + 8 = 14	x/4 = 16	3x = 15
This problem says:			
The operation is:			
The inverse operation is:			
To solve, I must:			

Solving One-Step Equations - Let's Practice!

4x = 20	x/3 = 8
12 = $\frac{x}{6}$	64 = 6x

Different Ways to Represent Operations

How many ways can we represent multiplication?

4 _____8

4 _____8

4 _____8

8___

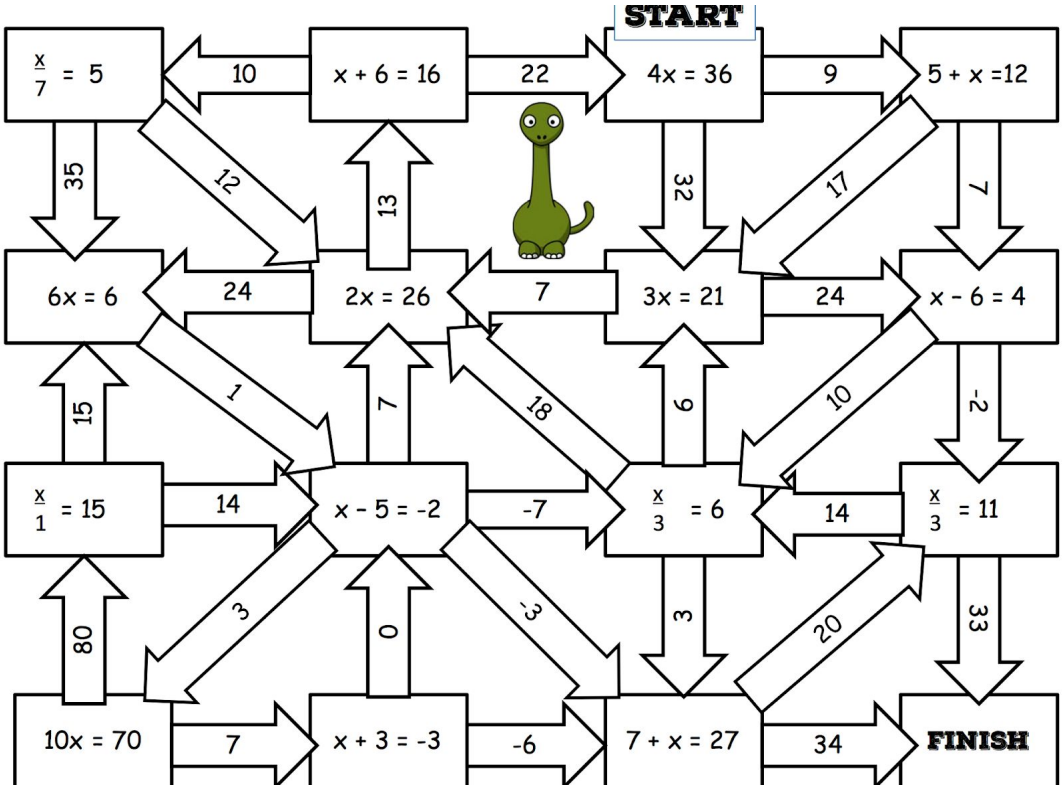
How many ways can we represent division?

4 ____ 12

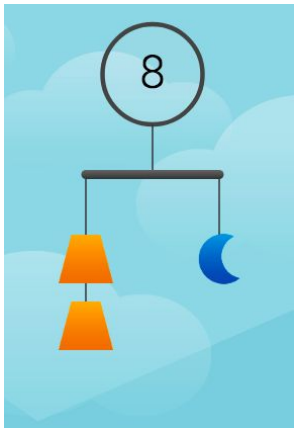
12 _____ 4

_____

Guided Practice - Maze Runner! *Show your work in the spaces below!*



4x = 36 $\frac{4x}{4} = \frac{36}{4}$ **X = 9**	5 + x = 12 5 + x **- 5** = 12 **- 5** x = 7	

Lesson **4.4** **DO-NOW**		***Find the value of the shapes in the puzzle:*** Orange trapezoid: _____ Blue moon: _____ ***Explanation:***
Homework Reminder	Shade in the box if you turned in your homework. ***"Excellence is not an art. It is the habit of practice." - Aristotle***	
Check-In	How are you doing today? What do you wonder about algebra?	

Inverse Operations			
	$\frac{3}{4} = \frac{x}{3}$	$3.4 = x + 3.2$	$5x = 12$
This problem says:			
The operation is:			
The inverse operation is:			
To solve, I must:			

Solving One-Step Equations - Let's Practice!	
SOLVE	**CHECK BY SUBSTITUTION**
$\frac{3}{4} = \frac{x}{3}$	
$3.4 = x + 3.2$	

$5x = 12$	
$5x = \frac{3}{2}$	

Checking By Substitution	
Solve the equation for the given variable.	**Check your work by substituting your answer back into the original equation.**

Let's Practice

For each of the following problems, solve the equation for the given variable. ***Show your work for every problem and CHECK YOU SOLUTION.*** Credit will only be given if you show your work.

$23.7 + x = 12.9$	$\frac{1}{4}x = 5$	$\frac{x}{3.5} = 4$
$\frac{5}{4} = x - \frac{1}{2}$	$\frac{x}{3} = \frac{1}{3}$	$2.4x = 24$

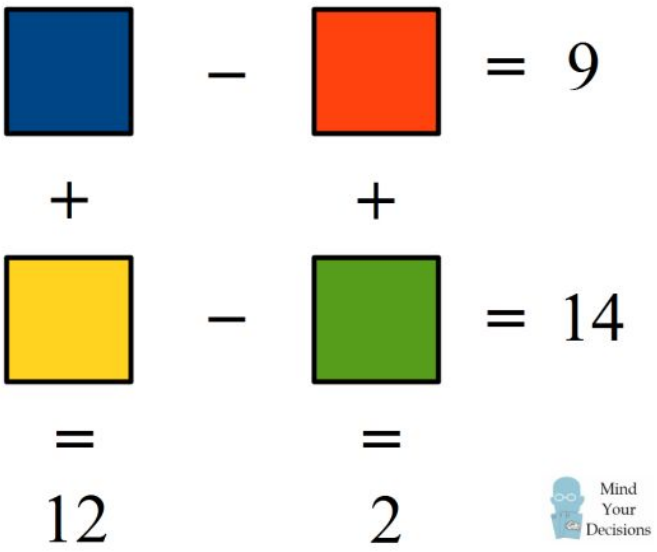
Guided Practice - Error Analysis

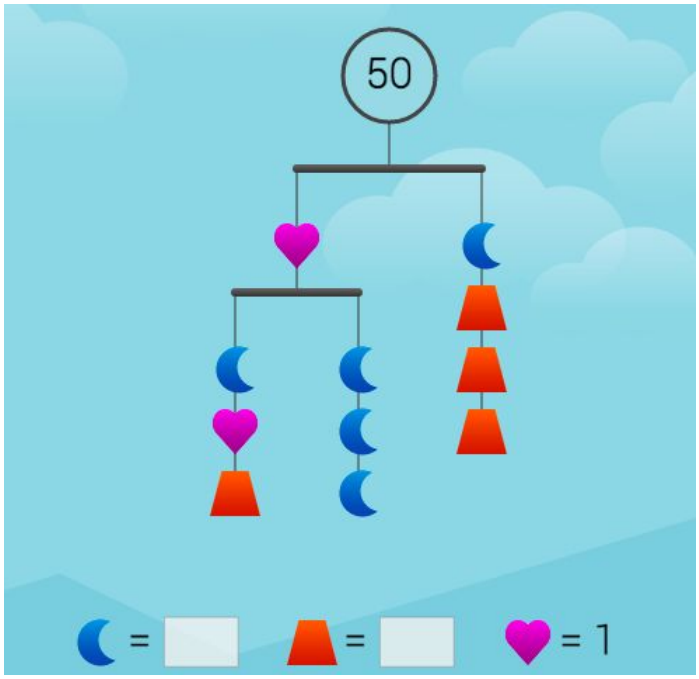
Directions - In the spaces below, complete the error analysis by determining what each student did incorrectly and what each student should have done to solve each problem.

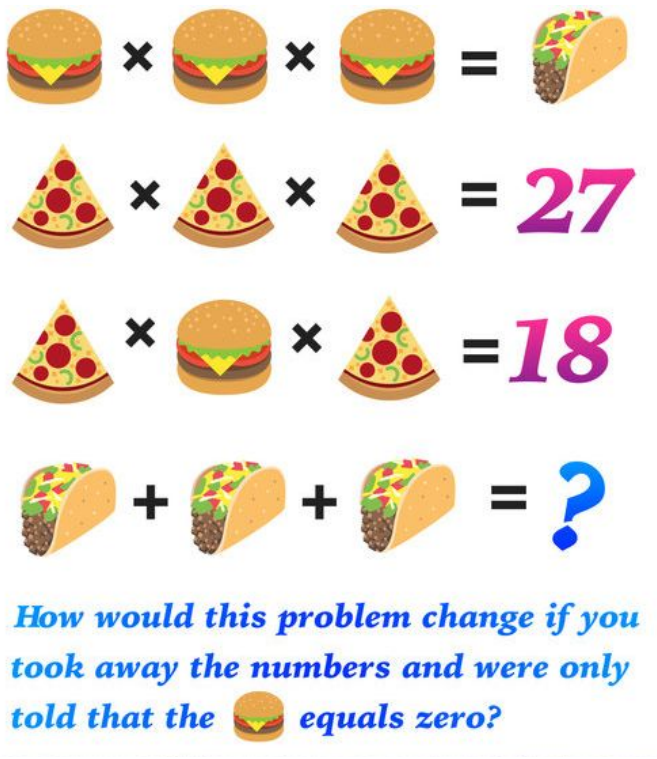
Problem	**In words, describe the mistake this student made.**	**In words, describe what this student should have done.**	**Rewrite and solve the problem.**	**Check your answer by plugging it into the original equation.**
1. $n + 3 = 19$; $+3 \quad +3$; $n = 22$				
2. $3n = 18$; $\cdot 3 \quad \cdot 3$; $n = 54$				
3. $n + 2 = -9$; $-2 \quad -2$; $n = -7$				
4. $\frac{n}{3} = -6$; $\div 3 \quad \div 3$; $n = -2$				

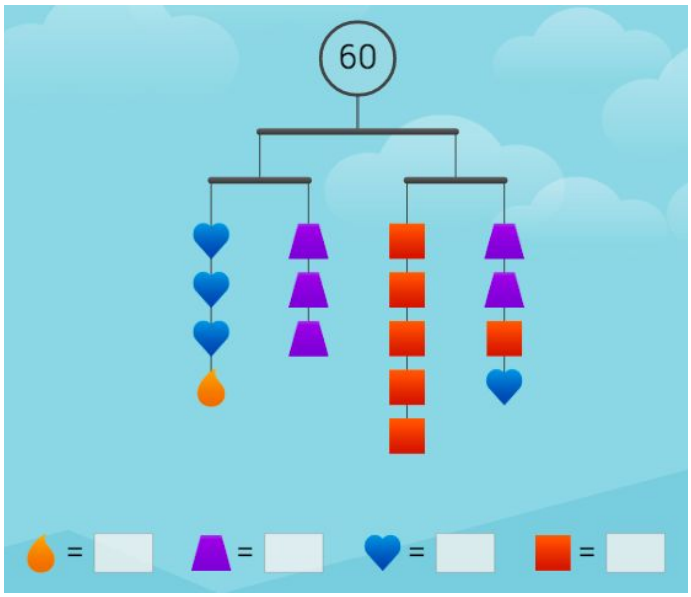
Problem	In words, describe the mistake this student made.	In words, describe what this student should have done.	Rewrite and solve the problem.	Check your answer by plugging it into the original equation.
5. $-5 + 3n = 10$ $-2n = 10$ $\div -2 \quad \div -2$ $n = -5$				
6. $-4n - 2 = 4$ $+4 \quad +4$ $n - 2 = 8$ $+2 \quad +2$ $n = 10$				
7. $\frac{n}{4} + -8 = 20$ $+8 \quad +8$ $\frac{n}{4} = 28$ $\div 4 \quad \div 4$ $n = 7$				
Create your own!				

Extra Time? Math Riddles: Using Algebraic Critical Thinking Skills! Yippee!









WORK SPACE:

Math Talks

4.1 What does it mean to make an equivalent expression? How is this helpful when solving problems?	4.2 How can factoring and distributing help us simplify expressions and eventually solve equations? What prior knowledge are we using to implement these properties?
4.3 What is the difference between an expression and an equation? How can we use them differently?	4.4 What does it mean to keep an equation balanced?

Workbook Reflection

Answer the question as completely as possible, using evidence from what we have learned this unit. Justify your response with examples and evidence from throughout the packet.

How can we create equivalent expressions? What is the purpose of creating equivalent expressions?

Choose one of the following concepts and describe it. Include visuals to support your answer.

- *Balanced Scale*
- *Combine Like Terms*
- *Equations vs. Expressions*

What lesson most challenged your thinking?

What would you have done differently?

Flip through your packet, and look to see if you shaded the box every day for turning in your homework. How many days did you shade it in?

Lesson 1	Lesson 2	Lesson 3	Lesson 4

If you didn't finish it each night, consider why →

Would you like to come in during lunch or recess for support?