Teacher(s): Mrs. Breazeale (Ms. DeBLanc) & Mr. Contreras **Subject/Grade:** 7th /Grade Math **Week of:** Oct 9, 2023

Domain: The Number System **Lesson Plan Title:** EQUIVALENT EXPRESSIONS

	MATHEMATICS - Mississippi College and Career Readiness Standards for 7th Grade
Numbers & Operations	7.NS. 1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addi...
Ratios & Proportions	7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems.
Expressions & Equations	7.EE Solve real-life and mathematical problems using numerical and algebraic expressions and equations. 7.EE.1 Apply properties as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
Geometry	7.G Draw, construct, and describe geometrical figures and describe the relationships between them.

REMEDIATION & ENRICHMENT

Students	Skill(s) & Activity	Days
P25	Students will be given multiple prompts to stay on task and to record notes during the iReady lesson. During test correction day, students will be placed in a small group with a teacher to clear up any misconceptions. Students will be given multiple prompts to stay on task. The teacher will stay close to answer any questions and clear up misconceptions. Students will be asked to repeat information frequently throughout the week.	**M** **W** **F** **M, W, R, F**
Bubbles	Students will be given opportunities to teach their peers and learn from their peers. Students will be asked to repeat information frequently and summarize information periodically.	**M** **M, W, R, F**
T25	Students will be given multiple opportunities to teach their peers and will be asked HOT questions throughout the week. (Example: These students will be asked to summarize information presented often.)	**M, W, R, F**

ESSENTIAL QUESTION(S): How do I solve real-life and mathematical problems using numerical and algebraic expressions and equations?

Date	Day	Objective	Focus Question	I will...
10/9	M	TSWBAT rewrite expressions using mathematical properties by completing the assigned iReady lesson "Equivalent Linear Expressions" with 80% accuracy by the end of the lesson.	How will I apply properties as strategies to add, subtract, factor, and expand linear expressions with rational coefficients?	-Apply properties as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. -Use iReady to enhance my mathematical skills.
10/10	T	TSWBAT complete 30 vocabulary and adding and subtracting integers with 80% accuracy by the end of the lesson.	How will I use number lines and models to add and subtract integers?	-Identify equations that represent real-world mathematical problems. -Use number lines and models to add and subtract integers. -Utilize previous lesson vocabulary.
10/11	W	TSWBAT **examine, analyze, and correct their current mixed practice test (MPT)** by **reviewing resources provided by the teacher, consulting with peers, and/or asking the teacher for help** with 100% accuracy by the end of the lesson.	How will I analyze and correct their graded tests in order to reflect on knowledge needed to master 7th grade math standards?	-Differentiate between silly mistakes and lack of knowledge. -In writing, explain the silly mistake and rework the problems that contain silly mistakes. -Use resources to help correct mistakes where mastery is not yet obtained.
10/12	Th	TBA based on MPT data.	TBA	TBA
10/13	F	TSWBAT generate equivalent expressions **with a hands-on activity and activity sheets** with 70% accuracy by the end of the lesson	How will I generate equivalent expressions using the commutative and associative properties?	-Generate equivalent expressions using the fact that addition and multiplication can be done in any order (commutative property) and any grouping (associative property). .

MONDAY_ Oct 9, 2023

WARM-UP/HOOK: *The student will* login to iReady and choose "Equivalent Linear Expressions." Take notes on lesson vocabulary and lesson goals. **(5 minutes)**

TEACHER INPUT: **(30 minutes)**

The teacher will …

- Present the lesson objectives.
- Use questioning strategies to ALL students to answer questions.
- Direct students to copy at least 3 examples from the lesson.

INDEPENDENT PRACTICE: **(10 minutes)**

The student will …

- Complete the lesson quiz with 80% or higher accuracy.

STUDENT REFLECTION/EXIT TICKET: *The student will* complete an exit ticket based on today's learning target. The teacher will use this data to determine which students need extra support. **(5 minutes)**

MATERIALS: notebook paper or "iReady Notes template," computers, projector, exit tickets

ASSESSMENT(S): Teacher observation, exit tickets, iReady lesson quiz results

TUESDAY_ Oct 10, 2023

MPT 2.1 will be given in the morning.

WARM-UP/HOOK: *The student will* write their name on their paper (1st Quarter Math Review: Set 1 Activity Sheet) and read the directions. **(3 minutes)**

TEACHER INPUT: **(2 minutes)**

The teacher will ...

- Explain what students will do for parts 1 and 2.
- Demonstrate how to bubble in their scantron.
- Explain it must be finished before they leave class.

INDEPENDENT PRACTICE: **(35 minutes)**

The student will ...

- Complete review packet quietly.

STUDENT REFLECTION/EXIT TICKET: *The teacher will answer any questions students might have.* **(5 minutes)**

MATERIALS: scantrons, activity sheets, number lines

ASSESSMENT(S): Teacher observation, graded activity sheets.

MPT 2.1 Results

Class	0% - 49% (Critical)	50% - 69% (Emerging)	70% - 100% (Proficient)
1st			
3rd			
4th			
5th			
7th			

WEDNESDAY_ Oct 11, 2023

WARM-UP/HOOK: *The student will* grab a data analysis sheet and a class set of Tuesday's test. Write their name, date, etc. *The teacher* will pass back their Tuesday tests. **(5 minutes)**

TEACHER INPUT: (2 minutes)

The teacher will …

- Direct student to mark an "X" on the questions that the students missed.
- Explain that they will use the class set of the test that includes "Teacher Notes" to rework the problems and/or explain what silly mistake they made.

INDEPENDENT PRACTICE: (30 minutes)

The student will …

- Rework problems on their test paper.
- Justify why they missed certain problems.
- Compare their graded test to the teacher's class set/guided notes and questions.
- Identify careless mistakes and correct them.
- Use the UNRAVEL test taking strategy for math for questions not understood.
- Use the videos under the topic "Helpful Videos" in Google classroom recommended by the teacher for each question not understood.
- Notify the teacher when they think they are finished for feedback/review.
- Staple data analysis sheet to the top of their test.
- Get it signed by their parents or guardian and return the following day

Meanwhile…

TEACHER CONFERENCES: The teacher will invite individual students to her desk to discuss their most recent MPT and clear up any misconceptions and offer support. **(30 minutes)**

EARLY FINISHERS: The student will get iReady or Math Prodigy and wait patiently to be called to the teacher's desk to discuss the test and any misconceptions.

TEACHER INPUT: (10 minutes)

The teacher will ...

- Review the most missed problems or take any questions the students have.
- Check over student work and provide feedback.
- Choose a student to staple the remainder of the student's paper.
- Explain that it is mandatory to bring their tests back signed by tomorrow.

EARLY FINISHERS: *The student will* complete an activity from a choice board to complete.

MATERIALS: graded Tuesday tests, test analysis sheets, stapler, staples, exit tickets

ASSESSMENT(S): Teacher observation, exit tickets, Tuesday tests

THURSDAY_ Oct 12, 2023

To Be Announced based on the most recent MPT Math data.

Most Missed Standard(s)	Objective(s)	Activity
	TSWBAT	
	TSWBAT	
	TSWBAT	

Meanwhile...

TEACHER CONFERENCES: TTW will finish inviting individual students to her desk to discuss their most recent MPT and clear up any misconceptions and offer support. **(30 minutes)**

STUDENT REFLECTION/EXIT TICKET: *The student will* complete an exit ticket based on the most missed question(s). The teacher will use this data to determine which students need extra support. **(5 minutes)**

MATERIALS: returned Tuesday tests, exit tickets

ASSESSMENT(S): Teacher observation, exit tickets

FRIDAY_ Oct 13, 2023

Lesson Notes

- The any order, any grouping property introduced in this lesson combines the commutative and associative properties of both addition and multiplication.
- The commutative and associative properties are regularly used in sequence to rearrange terms in an expression without necessarily making changes to the terms themselves. Therefore, students utilize any order, any grouping property as a tool of efficiency for manipulating expressions.
- The definitions presented below, related to variables and expressions, form the foundation of the next few lessons in this topic.

VARIABLE	a symbol (such as a letter) that represents a number, i.e., it is a placeholder for a number. A variable is actually quite a simple idea: it is a placeholder—a blank—in an expression or an equation where a number can be inserted. A variable holds a place for a single number throughout all calculations done with the variable—it does not vary.
NUMERICAL EXPRESSION	is a number, or it is any combination of sums, differences, products, or divisions of numbers that evaluates to a number. Statements such as "3+" or "3÷0" are not numerical expressions because neither represents a point on the number line.
VALUE OF A NUMERICAL EXPRESSION	the number found by evaluating the expression. For example, $1/3 \cdot (2+4)-7$ is a numerical expression, and its value is -5. (Note to teachers: Please do not stress words over meaning here; it is acceptable to use "number computed," "computation," "calculation," etc. to refer to the value as well.)

EXPRESSION	a numerical expression, or it is the result of replacing some (or all) of the numbers in a numerical expression with variables. There are two ways to build expressions: We can start out with a numerical expression, such as 1/3·(2+4)−7, and replace some of the numbers with letters to get 1/3·(x+y)−z. We can build such expressions from scratch, as in x+x(y−z), and note that if numbers were placed in the expression for the variables x, y, and z, the result would be a numerical expression.
AN EXPRESSION IN EXPANDED FORM	An expression that is written as sums (and/or differences) of products whose factors are numbers, variables, or variables raised to whole number powers is said to be in expanded form. A single number, variable, or a single product of numbers and/or variables is also considered to be in expanded form.
AN EXPRESSION IN STANDARD FORM	An expression that is in expanded form where all like terms have been collected is said to be in standard form. *** **Important**: An expression in standard form is the equivalent of what is traditionally referred to as a simplified expression. This curriculum does not utilize the term "simplify" when writing equivalent expressions, but rather asks students to "put an expression in standard form" or "expand the expression and combine like terms." However, students must know that the term simplify will be seen outside of this curriculum and that the term is directing them to write an expression in standard form.

Lesson Prep & Materials: Prepare a classroom set of manila envelopes (non-translucent). Cut and place four triangles and two quadrilaterals in each envelope (provided at the end of this lesson). These envelopes are used in the Opening Exercise of this lesson; copies of exit tickets, & copies of activity sheets

BELLRINGER/ANTICIPATORY SET: As students enter the classroom, provide each one with an envelope containing two quadrilaterals and four triangles; instruct students not to open their envelopes. Divide students into teams of two to complete parts (a) and (b) on an activity sheet. This exercise requires students to represent unknown quantities with variable symbols and reason mathematically with those symbols to represent another unknown value.

a) **Write an expression using t and q that represents the total number of sides in your envelope. Explain what the terms in your expression represent. $3t+4q$. Triangles have 3 sides, so there will be 3 sides for each triangle in the envelope. This is represented by $3t$. Quadrilaterals have 4 sides, so there will be 4 sides for each quadrilateral in the envelope. This is represented by $4q$. The total number of sides will be the number of triangle sides and the number of quadrilateral sides together.**

b) **You and your partner have the same number of triangles and quadrilaterals in your envelopes. Write an expression that represents the total number of sides that you and your partner have. If possible, write more than one expression to represent this total. $3t+4q+3t+4q$; $2(3t+4q)$; $6t+8q$**

Discuss the variations of the expressions in part (b) and whether those variations are equivalent. This discussion helps students understand what it means to combine like terms; some students have added their number of triangles together and number of quadrilaterals together, while others simply doubled their own number of triangles and quadrilaterals since the envelopes contain the same number. This discussion further shows how these different forms of the same expression relate to each other. Students then complete part (c).

c) **Each envelope in the class contains the same number of triangles and quadrilaterals. Write an expression that represents the total number of sides in the room. Answer depends on the number of students in the classroom. For example, if there are 12 students in the classroom, the expression would be $12(3t+4q)$, or an equivalent expression.**

Next, discuss any variations (or possible variations) of the expression in part (c), and discuss whether those variations are equivalent. Are there as many variations in part (c), or did students use multiplication to consolidate the terms in their expressions? If the latter occurred, discuss the students' reasoning.

Choose one student to open an envelope and count the numbers of triangles and quadrilaterals. Record the values of t and q as reported by that student for all students to see. Next, students complete parts (d), (e), and (f).

Have all students open their envelopes and confirm that the number of triangles and quadrilaterals matches the values of t and q recorded after part (c). Then, have students count the number of sides contained on the triangles and quadrilaterals from their own envelope and confirm with their answer to part (d). Next, have partners count how many sides they have combined and confirm

that number with their answer to part (e). Finally, total the number of sides reported by each student in the classroom and confirm this number with the answer to part (f).

When finished, have students return their triangles and quadrilaterals to their envelopes for use by other classes. **(15 minutes)**

TEACHER INPUT: (I do.) **(15 minutes)**

The teacher will …

- Say "Look at example 1. This example examines how and why we combine numbers and other like terms in expressions.
- An **expression** that is written as sums (and/or differences) of products whose factors are numbers, variables, or variables raised to whole number powers is said to be in expanded form.
- A single number, variable, or a single product of numbers and/or variables is also considered to be in expanded form. Examples of expressions in **expanded form** include 324, $3x$, $5x+3-40$, $x+2x+3x$, etc. Each summand of an expression in expanded form is called a term, and the number found by multiplying just the numbers in a term together is called the coefficient of the term."
- After defining the word term, students can be shown what it means to "combine like terms" using the distributive property.
- Show students how to write the example in expanded form.
- Say, "An expression in expanded form with all its like terms collected is said to be in **standard form**."
- Demonstrate.
- Say, "Because both terms have the common factor of x, we can use the distributive property to create an equivalent expression."
- Demonstrate.
- Ask students to try to find an example (a value for x) where $5x+3x \neq 8x$ or where $5x-3x \neq 2x$. Encourage them to use a variety of positive and negative rational numbers. Their failure to find a counterexample will help students realize what equivalence means
- Say, "In Example 1, part (b), we see that the commutative and associative properties of addition are regularly used in consecutive steps to reorder and regroup like terms so that they can be combined. Because the use of these properties does not change the value of an expression or any of the terms within the expression, the commutative and associative properties of addition can be used simultaneously. The simultaneous use of these properties is referred to as the any order, any grouping property. "
- Ask, "Why did we use the associative and commutative properties of addition?" **Possible Answer**: We reordered the terms in the expression to group together like terms so that they could be combined.

- Ask, " Did the use of these properties change the value of the expression? How do you know?" **Possible Answer**: The properties did not change the value of the expression because each equivalent expression includes the same terms as the original expression, just in a different order and grouping.
- Ask, " If a sequence of terms is being added, the any order, any grouping property allows us to add those terms in any order by grouping them together in any way. How can we confirm that the expressions $(2x+1)+5x$ and $7x+1$ are equivalent expressions? **Possible Answer**: When a number is substituted for the x in both expressions, they both should yield equal results.
- The teacher and student should choose a number, such as 3, to substitute for the value of x and together check to see if both expressions evaluate to the same result.
- Direct students to example 2: find the product of 2x and 3.
- Students relate a product to its expanded form and understand that the same result can be obtained using any order, any grouping since multiplication is also associative and commutative.
- Ask, "Why did we use the associative and commutative properties of multiplication? **Possible Answer:** We reordered the factors to group together the numbers so that they could be multiplied.
- Ask, " Did the use of these properties change the value of the expression? How do you know? **Possible Answer:** The properties did not change the value of the expression because each equivalent expression includes the same factors as the original expression, just in a different order or grouping.
- Say, "If a product of factors is being multiplied, the any order, any grouping property allows us to multiply those factors in any order by grouping them together in any way."

GUIDED PRACTICE: (We do.) **(10 minutes)**

The teacher will …

- Direct students to example 3: 3(2x)
- Students use any order, any grouping to rewrite products with a single coefficient first as terms only, then as terms within a sum, noticing that any order, any grouping cannot be used to mix multiplication with addition.
- Ask students to try to find an example (a value for x) where $3(2x)\neq 6x$. Encourage them to use a variety of positive and negative rational numbers because in order for the expressions to be equivalent, the expressions must evaluate to equal numbers for every substitution of numbers into all the letters in both expressions. Again, the point is to help students recognize that they cannot find a value—that the two expressions are equivalent. Encourage students to follow the order of operations for the expression $3(2x)$: multiply by 2 first, then by 3.
- Encourage students to substitute a variety of positive and negative rational numbers for x and y because in order for the expressions to be equivalent, the expressions must evaluate to equal numbers for every substitution of numbers

into all the letters in both expressions.

- Ask, "What can be concluded as a result of part (f)? **Possible Answer:** Any order, any grouping cannot be used to mix multiplication with addition. Numbers and letters that are factors within a given term must remain factors within that term.

CLOSING: (5 minutes)

The teacher will…

- Say, "Terms that contain exactly the same variable symbol can be combined by addition or subtraction because the variable represents the same number. Any order, any grouping can be used where terms are added (or subtracted) in order to group together like terms. Changing the orders of the terms in a sum does not affect the value of the expression for given values of the variable(s)."
- Ask, "We found that we can use any order, any grouping of terms in a sum, or of factors in a product. Why? **Possible Answer:** Addition and multiplication are both associative and commutative, and these properties only change the order and grouping of terms in a sum or factors in a product without affecting the value of the expression.
- Ask, "Can we use any order, any grouping when subtracting expressions? Explain." **Possible Answer:** We can use any order any grouping after rewriting subtraction as the sum of a number and the additive inverse of that number so that the expression becomes a sum.
- Ask, "Why can't we use any order, any grouping in addition and multiplication at the same time**? Possible Answer:** Multiplication must be completed before addition. If you mix the operations, you change the value of the expression.

EXIT TICKET: The student will complete an exit ticket.**(5 minutes)**
ASSESSMENT(S): Teacher observation, completed exit tickets

MISSISSIPPI STATE STANDARDS ACROSS CURRICULUM

Math Standards

Numbers & Operations:

7.NS. 1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

7.NS.1a Describe situations in which opposite quantities combine and make 0.

7.NS.1b Understand that p + q is the number located a distance from the absolute value of q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0. Interpret sums of rational numbers by describing real-world contexts.

7.NS.1c Understand subtraction of rational numbers as adding the additive inverse. Show that the distance between two rational numbers on a number line is the absolute value of their difference, and apply this principle in real-world contexts.

7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

7.NS.2a Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

7.NS.2b Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-p/q = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.

7.NS.2c Apply properties of operations as strategies to multiply and divide rational numbers.

7.NS.2d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

Ratios & Proportions:

7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems.

7.RP.1 Compute unit rates associated with ratios and fractions, including ratios or lengths, areas and other quantities measured in like of different units.

7.RP.2 Recognize and represent proportional relationships between quantities.

7.RP.2a Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

7.RP.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
7.RP.2c. Represent proportional relationships by equations.
7.RP.2d . Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.

Expressions & Equations:

7.EE Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
7.EE.1 Apply properties as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

Geometry:

7.G Draw, construct, and describe geometrical figures and describe the relationships between them.
7.G.1 Solve problems involving geometric figures, including actual lengths and area of a scale drawing.