

Teacher(s): Mrs. Breazeale & (Ms. DeBlanc)

Subject/Grade: 7<sup>th</sup> /Grade Math

Week of: Nov 27, 2023

Domain: Expressions & Equations

Lesson Plan Title: EQUATIONS

**This plan is for my 5th period class ONLY!**

(Note to Admin: See attached list of students.)

MATHEMATICS - Mississippi College and Career Readiness Standards for 7 <sup>th</sup> 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. 7.EE.2 Understand that rewriting an expression in different, yet equivalent, forms in a problem can show how the quantities in it are ... 7.EE.3 Write an expression from a real world context possibly involving sales tax, tip, discount, gratuity, markup, selling price, perim... 7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequaliti...
Geometry	7.G Draw, construct, and describe geometrical figures and describe the relationships between them. 7.G Draw, construct, and describe geometrical figures and describe the relationships between them.
Statistics & Probability	7.SP.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the di... 7.SP.4 Use measures of center and measures of variability (i.e. inter-quartile range) for numerical data from random samples to dra...

### ACROSS CURRICULUM STANDARDS

#### ELA - Mississippi College and Career Readiness Standards for 7<sup>th</sup> Grade

##### Reading Informational Text

**CCR.R.1:** Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

**CCR.R.10** Read and comprehend complex literary and informational texts independently and proficiently.

**RI.7.10** By the end of the year, read and comprehend literary nonfiction in the grades 6-8 text complexity band proficiently, with scaffolding as needed at the high end of the range.

## **Writing**

**CCR.W.1:** Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.

**W.7.2b** Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.

**W.7.2c** Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.

**W.7.2d** Use precise language and domain-specific vocabulary to inform about or explain the topic.

**W.7.2e** Establish and maintain a formal style.

**W.7.2f** Provide a concluding statement or section that follows from and supports the information or explanation presented.

**W.7.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

**W.7.10** Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

## **Language**

**CCR.L.1:** Demonstrate command of the conventions of standard English grammar and usage when writing (printing, cursive, or keyboarding) or speaking.

**L.7.1b** Choose among simple, compound, complex, and compound-complex sentences to signal differing relationships among ideas.

**CCR.L.2:** Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

**L.7.2b** Spell correctly.

**L.7.4b** Use common, grade appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., belligerent, bellicose, rebel).

**L.7.4c** Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

**L.7.4d** Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).

**CCR.L.6:** Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**L.7.6** Acquire and use accurately grade-appropriate general academic and domain specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ESSENTIAL QUESTION(S):** How will I use variables to represent quantities in a real-world mathematical problem, and construct simple equations to solve problems by reasoning about quantities?

Date	Objective	Focus Question	I will...
11/27 M	TSWBAT label and describe all parts of an equation by reading and annotating a text that focuses on algebraic vocabulary with 80% accuracy by the end of the lesson.	What is the purpose of each part of an equation and how can I use this knowledge to find the value of unknown numbers?	<ul style="list-style-type: none"> <li>-Read and annotate the text titled "Algebra &amp; Algebraic Thinking" while focusing on the lesson vocabulary.</li> <li>-Use the text to help me label, describe, and explain the purpose of each part that makes up an equation in a one paragraph essay.</li> </ul>
11/28 T	TSWBAT complete the iReady lesson titled "Solve Multi Step Equations Part 1."	How do I solve one-variable equations of the form $mx + b = y$ in which $m$ , $b$ , and $y$ are non-zero rational numbers?	Solve one-variable equations of the form $mx + b = y$ in which $m$ , $b$ , and $y$ are non-zero rational numbers.
11/29 W	TSWBAT examine, analyze, and correct their current mixed practice test (MPT 2.6) 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 do mathematicians analyze and correct their graded tests in order to reflect on knowledge needed to master 7th grade math standards?	<ul style="list-style-type: none"> <li>-Differentiate between silly mistakes and lack of knowledge.</li> <li>-In writing, explain the silly mistake and rework the problems that contain silly mistakes.</li> <li>-Use resources to help correct mistakes where mastery is not yet obtained.</li> </ul>
11/30 R	TSWBAT translate real-world mathematical problems into simple equations by identifying the constant, variable, rate, and total using the format $mx + b = y$ .	How will I construct an equation once the variable, constant, and rate have been identified?	<p>Read and analyze real-world problems by identifying the rate/variable, constant, and sum or difference (total).</p> <p>Write a simple equation using <math>y=mx+b</math> format.</p>
12/1 F	TSWBAT write equations in the format $MX+B=Y$ and solve for $x$ .	How do I write and solve equations? (Review for the week)	Write and solve equations.

**MONDAY\_ Nov 27, 2023**

**BEFORE CLASS:**

*The teacher will...*

- Create a folder for each individual student in her 5th period class. The contents of the folder are: individual student behavior and/or academic goals for 7th grade math, class work for that day, days, or the week (depending on the school-wide schedule), and expectations for that class period. These folders will be placed on students' desks along with a sharp pencil, calculator, and "student needs help" signal (3 small cards -red, yellow, and green-bound together by a book ring). Two blank sticky notes will be inside the folder for student questions.
- Create a poster of how to enter the classroom (made larger than original) and post outside the door.
- A detailed schedule will be posted on a separate board for this class period.
- Create multiple keys for the assignments students are working on that day.
- Create a list of the order students will enter the room (least disruptive to most disruptive).
- Great students outside the classroom and review the expectations for entering the classroom: **1st:** Silently, go straight to your desk. **2nd:** Bookbags, purses, etc. go under the desk or hang it on the back of your seat. (Nothing should be in your lap.) **3rd:** Review the contents of your folder and begin working. **(THIS IS ALL DONE WITHOUT A SOUND.)**
- Call the first 5 students to follow the "entering the classroom procedure" and go to their seat.
- Repeat the expectations for the next group. **(5 students)**
- When we get to the students that struggle with this procedure, the teacher will remind each one individually and let them in one at a time. (Students that do not follow this procedure will have an immediate redo. If the student cannot do it the second time, the student will write the entering classroom procedure. Once written, they will practice 3 times before being allowed to begin work they must make up later.)

**During Class –INDEPENDENT PRACTICE**

*The student will...*

- Read goals and plan for success and write any questions they have on the two sticky notes inside their folder. **(5 minutes)**
- Read the text "Algebra and Algebraic Thinking" which introduces and reviews all the vocabulary students will need to successful when solving equations and inequalities. **(7-10 minutes)**

- Answer five **DOK 1 & 2** open ended questions about the text. (Students will be graded on restating and answering the question correctly. Starting their sentence with a capital letter and ending with a period with minimal spelling errors. **(10-15 minutes)**)
- Examine a given equation and label the parts using mathematical vocabulary - constant, term, variable, coefficient, expression, equation, and operation - using the text if needed. **(DOK 1) (3-5 minutes)**
- Create and write their own equation with conditions and label each part. **(DOK 2) (5 minutes)**
- Respond to the following prompt: Analyze the equation below and provide a detailed explanation of each component: term, variable, coefficient, constant, operation, expression, and equation. Provide a clear explanation of what each component represents and how it contributes to the equation. Use the text to help you answer the question:  $2(a + b) - 3c = 5d$  **(DOK 3) (10-15 minutes)**
- Work until their elective is called.

**Teacher 1** will...

- Lap the room, monitoring students while giving silent feedback with a colorful pen.
- Keep the timer current on the board so students can pace themselves.
- Document observations of students that are struggling for individual help later.
- Sharpen pencils if needed, getting extra scratch paper for students, etc.
- Grade students work as they finish.

**Teacher 2** will...

- Pull individual students to her table to check for understanding on this assignment after an allotted amount of time since **PRODUCTIVE STRUGGLE IS BEAUTIFUL!** [Students that **Teacher 2** will check in with regardless if they are struggling are Four, Thirteen, Forteen, Five, and Seven.]
- Review, remediate, ask guided questions, and give strategies to complete the assignment.

**EARLY FINISHERS:** *The student will* work on the additional assignment that is placed in their folder.

- **Note:** Student work is based on the data from the Fall 2022-2023 iReady math diagnostics and its suggestions for academic grouping. The assignments are mostly based on iReady suggestions. The groups, work, and students in each group are as follows.

Group	Students	Assignment(s): From Online RGC Workbook (MS)
1	Three, Four, Five, Six, Seven, Thirteen, Forteen, & Nineteen	<b>Lesson 1:</b> Understand Place Value (5th Grade) Pages 2-5 <b>(5.NBT.1)</b>
2	One, Two, Eight, Nine, Fifteen, Eighteen, Twenty, & Twenty-One	<b>Lesson 1:</b> Ratios (6th Grade) Pages 2-7 <b>(6.RP.1)</b>
3	Ten	<b>Lesson 21:</b> Convert Measurement Units (5th Grade) Pages 212-215 & 218-219 <b>(5.MD.1)</b>
4	Twelve, Sixteen, Seventeen,	<b>Lesson 22:</b> Area of Polygons (6th Grade) Pages 244-251 <b>(6.G.1)</b>
5	Eleven	<b>Lesson 16:</b> Solve Problems with Equations (Mid 7th Grade) Pages 146-153 <b>(7.EE.3 &amp; 7.EE.4a)</b>

**CLOSURE:** The teacher will...collect student folders as they are called for electives.

**MATERIALS:** individual folders, larger "Entering the classroom procedure" to post outside the classroom, list of order students enter the room, pencils and calculators already on the desk, "Algebra & Algebraic Thinking" text & questions, individualized work based on students needs, teacher observation form, clipboard, colorful pen, and keys for all work, manipulatives for the teacher center

**ASSESSMENT(S):** Teacher observation, completed written assignment

**TUESDAY\_ Nov 28, 2023**

**MPT 2.6 will be given.**

**BEFORE CLASS:**

*The teacher will...*

- Post a detailed schedule will be posted on a separate board for this class period.
- Folders will be placed on their desk with feedback from the day before, iReady notes template, and additional work customized to the student (see table above).
- Great students outside the classroom and review the expectations for entering the classroom: **1st:** Silently, go straight to your desk. **2nd:** Bookbags, purses, etc. go under the desk or hang it on the back of your seat. (Nothing should be in your lap.) **3rd:** Review the contents of your folder and begin working. **(THIS IS ALL DONE WITHOUT A SOUND.)**
- Call the first 5 students to follow the “entering the classroom procedure” and go to their seat.
- Repeat the expectations for the next group. (5 students)
- When we get to the students that struggle with this procedure, the teacher will remind each one individually and let them in one at a time. (Students that do not follow this procedure will have an immediate redo. If the student cannot do it the second time, the student will write the entering classroom procedure. Once written, they will practice 3 times before being allowed to begin work they must make up later.) **If these are repeat offenders from Monday, they will write the entering the classroom procedure 5 times and practice 10 times before being allowed to begin work they must make up later.**

**INDEPENDENT PRACTICE: ( 40 minutes)**

*The student will ...*

- Login to iReady. Write down the lesson title (**Solve Multi-Step Equations Part 1**), class period, and date on the recording sheet. Take notes on lesson vocabulary and lesson goals
- Listen and complete a lesson (**Solve Multi-Step Equations Part 1**).
- Complete the lesson quiz with 80% or higher accuracy.

**STUDENT REFLECTION/EXIT TICKET:** *The student will* reflect on what they learned from the iReady lesson they just took based on their individual learning target. The teacher will use this data to determine which students need extra support. The teacher will...collect student folders as they are called for electives. **(5 minutes)**

**MATERIALS:** notebook paper or “iReady Notes template,” computers, projector, exit tickets

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

**WEDNESDAY\_ Nov 29, 2023**

**READING DIAGNOSTICS WILL BE GIVEN TODAY!**

**BEFORE CLASS:**

*The teacher will...*

- Post a detailed schedule will be posted on a separate board for this class period.
- Folders will be placed on their desk with feedback from the day before, their class's scores from yesterday's MPT, their graded MPT, and class set of tests with teacher notes, and additional work customized to the student (see table above).
- Great students outside the classroom and review the expectations for entering the classroom: **1st:** Silently, go straight to your desk. **2nd:** Bookbags, purses, etc. go under the desk or hang it on the back of your seat. (Nothing should be in your lap.) **3rd:** Review the contents of your folder and begin working. **(THIS IS ALL DONE WITHOUT A SOUND.)**
- Call the first 5 students to follow the “entering the classroom procedure” and go to their seat.
- Repeat the expectations for the next group. (5 students)
- When we get to the students that struggle with this procedure, the teacher will remind each one individually and let them in one at a time. (Students that do not follow this procedure will have an immediate redo. If the student cannot do it the second time, the student will write the entering classroom procedure. Once written, they will practice 3 times before being allowed to



begin work they must make up later.) If these are repeat offenders from Monday or Tuesday, they will write the entering the classroom procedure 10 times and practice 20 times before being allowed to begin work they must make up later.)

### **During Class –INDEPENDENT PRACTICE**

*The student will...*

- Find the mean, median, mode, and range of 5th period's MPT 2.6 scores. **(7 minutes)**
- Create a dot plot and box plot of the data. **(7 minutes)**
- Review their test and use a class set with teacher notes to rework missed problems from their test. 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. 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.) **(15-25 minutes)**
- Students that did not complete the iReady lesson from the day before will have a letter to Dr. Moss template where they can explain to her why they did not get their lesson and minutes this week. **(7 minutes)**
- Complete remedial work from their folder. (New work will be added as the teachers see students are getting near completion. Work not done to the best effort will be returned to the student with feedback and instructed to do the assignment over.)

**Teacher 1** will...

- Lap the room, monitoring students while giving silent feedback with a colorful pen.
- Keep the timer current on the board so students can pace themselves.
- Document observations of students that are struggling for individual help later.
- Sharpen pencils if needed, getting extra scratch paper for students, etc.
- Grade students work as they finish.

**Teacher 2** will...

- Pull individual students to her table to check for understanding and give clarity to missed questions from MPT 2.6. [Students that **Teacher 2** will check in with regardless if they are struggling are Four, Thirteen, Forteen, Five, and Seven.]
- Review, remediate, ask guided questions, and give strategies to complete the assignment

**CLOSURE:** *The student will* continue working until their election is called (Giving their folder to the teacher as they leave).

**(5 minutes)**

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

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

**THURSDAY\_ Nov 30, 2023**

**BEFORE CLASS:**

*The teacher will...*

- Post a detailed schedule will be posted on a separate board for this class period.
- Folders will be placed on their desk with feedback from the day before and additional work customized to the student (see table above).
- Great students outside the classroom and review the expectations for entering the classroom: **1st:** Silently, go straight to your desk. **2nd:** Bookbags, purses, etc. go under the desk or hang it on the back of your seat. (Nothing should be in your lap.) **3rd:** Review the contents of your folder and begin working. **(THIS IS ALL DONE WITHOUT A SOUND.)**
- Call the first 5 students to follow the “entering the classroom procedure” and go to their seat.
- Repeat the expectations for the next group. (5 students)
- When we get to the students that struggle with this procedure, the teacher will remind each one individually and let them in one at a time. (Students that do not follow this procedure will have an immediate redo. If the student cannot do it the second time, the student will write the entering classroom procedure. Once written, they will practice 3 times before being allowed to begin work they must make up later.) If these are repeat offenders from Monday or Tuesday, they will write the entering the classroom procedure 10 times and practice 20 times before being allowed to begin work they must make up later.) Third day in a row they have to have a “DO OVER,” they will be assigned “Practice Academy” during their elective or after school.

**During Class –INDEPENDENT PRACTICE**

*The student will...*

- Read and annotate the family letter on page 353 of the RCC workbook.
- Complete pages 354-358.
- Complete remedial work from their folder. (New work will be added as the teachers see students are getting near completion. Work not done to the best effort will be returned to the student with feedback and instructed to do the assignment over.)

**Teacher 1** will...

- Lap the room, monitoring students while giving silent feedback with a colorful pen.
- Keep the timer current on the board so students can pace themselves.
- Document observations of students that are struggling for individual help later.
- Sharpen pencils if needed, getting extra scratch paper for students, etc.
- Grade students work as they finish.

**CLOSURE:** *The student will* continue working until their election is called (Giving their folder to the teacher as they leave).  
**(5 minutes)**

**FRIDAY\_ Dec 1, 2023**

**MATH DIAGNOSTICS WILL BE GIVEN TODAY!**

**BEFORE CLASS:**

*The teacher will...*

- Post a detailed schedule will be posted on a separate board for this class period.
- Folders will be placed on their desk with feedback from the day before and additional work customized to the student (see table above).

- Great students outside the classroom and review the expectations for entering the classroom: **1st:** Silently, go straight to your desk. **2nd:** Bookbags, purses, etc. go under the desk or hang it on the back of your seat. (Nothing should be in your lap.) **3rd:** Review the contents of your folder and begin working. **(THIS IS ALL DONE WITHOUT A SOUND.)**
- Call the first 5 students to follow the “entering the classroom procedure” and go to their seat.
- Repeat the expectations for the next group. (5 students)
- When we get to the students that struggle with this procedure, the teacher will remind each one individually and let them in one at a time. (Students that do not follow this procedure will have an immediate redo. If the student cannot do it the second time, the student will write the entering classroom procedure. Once written, they will practice 3 times before being allowed to begin work they must make up later.) **If these are repeat offenders from Monday or Tuesday, they will write the entering the classroom procedure 10 times and practice 20 times before being allowed to begin work they must make up later.)** **Third day in a row they have to have a “DO OVER,” they will be assigned “Practice Academy” during their elective or after school.**

### **During Class –INDEPENDENT PRACTICE**

*The student will...*

- Watch a prerecorded video of Mrs. Breazeale teaching the following lesson as they follow along.

**START VIDEO**

**Teacher Input: 10 minutes)**

*The teacher will...*

- Write  $MX + B = Y$  on the board.
- Say, “Today, we will be solving solving for “X” in  $MX + B = Y$ ”
- Equations such as  $mx + b = y$  are called linear equations because when graphed, they will give you a straight line. The x variable does not have an exponent with it, because linear equations never have exponents for their variables.
- You can easily solve equations of this form, along with equations of the form  $m(x + b) = y$ . In both equations, the m, b, and y represent rational numbers, either integers or fractions.
- It's really quite easy to solve the equation  $mx + b = y$ . Remember, you want to isolate your x variable and move everything over to the other side. Here are your steps: 1) Subtract b from both sides if positive, or add b to both sides

if negative. This gives you  $mx + b - b = y - b$ , which simplifies to  $mx = y - b$ . 2) Divide by  $m$  on both sides. This gives you  $mx / m = (y - b) / m$ , which simplifies to  $x = (y - b) / m$ .

- Let's take a look at some real-world examples of such a problem.
- Pass out a practice sheet.
- Present the focus question and learning goal.
- Rewrite the following format on the board:  $mx + b = y$  where  $m$  is the coefficient and rate,  $x$  is the variable,  $b$  is the constant, and  $y$  is the total (sum or difference).
- Explain how we construct equations to identify the variable, constant, and rate while reviewing this vocabulary and asking select students to give examples of each.
- (Say the variable is the letter and usually what we are trying to find. This variable is the unknown. The constant is a stand alone number not attached to any variables. The coefficient is paired with a variable. This is what the variable is being multiplied by. A rate is a special ratio in which the two terms are in different units. Explain that in the first problem we will practice, the rate is cost per month.)
- Explain that completing this task is like being on a scavenger hunt looking for clues in the word problem.
- Present the first problem. Instruct students to underline the questions and now predict which operation we will use.
- Read the first example while circling key words and numbers.

### **Writing and Solving Equations from Word Problems Guided Notes**

A. A new one-year membership at RecPlex costs \$160. A registration fee of \$28 is paid up front, and the rest is paid monthly. How much do new members pay each month?

1. Define the variable (What do we not know?):
2. Determine the constant (if there is one):
3. What is the rate (look for "each", "per", something that will repeat):
4. Write the equation and solve:

- Think aloud, “ I see the total cost is \$160 so that must go where r is. The \$28 is paid up front and this cost does not depend on anything else so this must be the constant.” Replace the q with \$28. “I know there are 12 months in a year so this must be my rate that goes with the variable.” Finish writing the equation.
- Okay, now I know how to solve it. Combine like terms and isolate the variable using the inverse operations.” Solve the equation.
- Demonstrate in this same manner problems B and C.

**Guided Practice: 15 minutes)**

*The teacher will...*

- Present problem D.
- Call on different students for different tasks. One to underline the question. Another student to predict which operation we will use. Another to read the problem while circling important information. Another to write the template on the board:  $mx + b = y$  , another to replace the r with the total, another student to replace the q with the constraint, and another to replace the rate. Lastly choose a student to solve the equation and that student chooses another to explain what they did.
- Repeat this process for problem E.

**START VIDEO**

**Independent Practice: 20 minutes)**

*The student will...*

- Complete problems F-I which the teachers lap and check work.
- Complete the remediation/enrichment work in their folder.

**MEANWHILE...**

**Teacher 1** (During the video and after) *will...*

- Lap the room, monitoring students while giving silent feedback with a colorful pen.

- Document observations of students that are struggling for individual help later.
- Sharpen pencils if needed, getting extra scratch paper for students, etc.
- Grades and gives feedback.

**Closure:** TTW write a reflection of how math class went this week. Give the teacher feedback and suggestions for how the lesson can be improved for next week. (5 minutes)

**Assessment:** Teacher Observation & Completed work.

## **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.

**7.RP.3** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

### **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.

**7.EE.2** Understand that rewriting an expression in different, yet equivalent, forms in a problem can show how the quantities in it are related.

**7.EE.3** Write an expression from a real world context possibly involving sales tax, tip, discount, gratuity, markup, selling price, perimeter, area, and angle measures of a triangle. • Evaluate an expression given a value for the variable. • Translate a verbal expression into an algebraic expression. • Use manipulatives such as algebra tiles to factor expressions.



**7.EE.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

**7.EE.4a** Solve word problems leading to equations of the form  $px + q = r$  and  $p(x + q) = r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

**7.EE.4b** Solve word problems leading to inequalities of the form  $px + q > r$  or  $px + q < r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.

**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.

**Statistics & Probability:**

**7.SP.3** Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

**7.SP.4** Use measures of center and measures of variability (i.e. inter-quartile range) for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.