Eureka Remediation Tool: Grade 7
Module 3, Topic B

To become mathematically proficient, students **must** access on-grade-level content. This document aims to help teachers who use the Eureka curriculum to target remediation for students needing extra support before and **during** approaching on-grade-level work, creating opportunities for on-time remediation directly connected to the new learning.

About this Topic

Focus Standards:

7.EE.B.3: Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), 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. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*

7.EE.B.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.

   a. 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?*

   b. Solve word problems leading to inequalities of the form $px + q > r, px + q \geq r$, $px + q < r \text{ or } px + q \leq r$, 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.*

7.G.B.5: Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.

Topic Overview per the Eureka Curriculum

Topic B begins in Lesson 7 with students evaluating equations and problems modeled with equations for given rational number values to determine whether the value makes a true or false number sentence. In Lessons 8 and 9, students are given problems of perimeter; total cost; age comparisons; and distance, rate, and time to solve. Students will discover that modeling these types of problems with an equation becomes an efficient approach to solving the problem, especially when the problem contains rational numbers (**7.EE.B.3**, **7.EE.B.4a**). Students apply the properties of equality to isolate the variable in these equations as well as those created to model missing angle problems in Lessons 10 and 11. All problems provide a real-world or mathematical context so that students can connect the (abstract) variable, or letter, to the number that it actually represents in the problem. The number already exists; students just need to find it.

Lesson 12 introduces students to situations that are modeled in the form $px + q > r$ and $px + q < r$. Initially, students start by translating from verbal to algebraic, choosing the inequality symbol that best represents the given situation. Students then find the number(s) that make each inequality true. To better understand how to solve an inequality containing a variable, students look at statements comparing numbers in Lesson 13. They discover when (and why) multiplying by a negative number reverses the inequality symbol when this symbol is preserved. In Lesson 14, students extend the idea of isolating the variable in an equation to solve problems modeled with inequalities using the properties of inequality. This topic concludes with students modeling inequality solutions on a number line and interpreting what each solution means within the context of the problem (**7.EE.B.4b**).

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Overview

Eureka Remediation Tools include:

1. a diagnostic assessment to help teachers determine the misunderstandings or gaps in mathematical knowledge related to a specific Topic in the Eureka curriculum
2. guidance for teachers to analyze student work on the diagnostic assessment
3. suggested materials for targeted remedial instruction

> Note: The use of this guidance is not intended to delay students' engagement with on-grade-level learning. On-grade-level learning should be the focus of instructional time and be treated as an opportunity for students to "finish" learning previous skills and deepen conceptual understanding.

Diagnostic Assessment

The diagnostic assessment is designed to be administered to targeted students prior to beginning instruction on the given Topic. When appropriate, it is broken into parts (Part A, Part B, and so on); each part addresses a different prerequisite standard and contains three problems. If a student correctly answers at least 2 out of the 3 problems, it can be assumed that he/she is ready to engage with the new content of the Topic with little to no support needed prior to engaging with the Topic. The diagnostic assessment is designed in this way so that teachers can determine the "entry point" to remedial instruction and/or opportunities for unfinished learning within the context of the new learning. The entry points and opportunities for unfinished learning will vary between students.

Guidance for Remediation

The Remediation Guidance is designed for teacher use. It is also broken into parts (Part A, Part B, and so on) and correlates to the parts on the diagnostic assessment. Each part contains the following:

1. **The focus standard**: The focus standards are strategically chosen to address prerequisite skills and are purposefully arranged in the order that students typically master the skills and knowledge.
2. **Why this is important for current grade level work**: This section describes how the work of the prerequisite standard relates to the standard(s) addressed in the Topic of instruction.
3. **Using the diagnostic assessment to identify gaps**: This section identifies common errors students make on the diagnostic assessment items.
4. **Remediation Resources for Targeted Instruction**: The resources pinpoint specific Eureka lessons and parts of lessons for teachers to use to address gaps in mathematical knowledge. Using Eureka materials to address remediation ensures alignment to the standards, consistency in approach to learning, and similarities in strategies for solving problems.
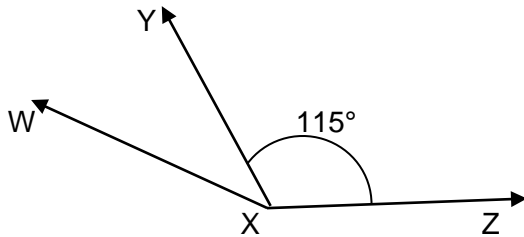
Part A: 4.MD.C.7

1. A right angle (∠=90°) is made up of two acute angles. If the measure of one angle is 43°, what is the measure of the second angle?

2. What is the measurement of ∠ABC?
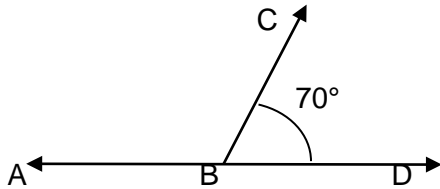
3. If angle WXZ = 160°, what is the measure of angle WXY?

Part B: 6.EE.B.6

4. The perimeter of a rectangle can be found using the expression $2w + 2l$, where w is the width of the rectangle and l the length. Create an expression that could be used to determine the perimeter of a rectangle after all side were tripled in length.

5. Kyle likes to make pancakes for breakfast where each batch of pancakes calls for 2 cups of flour. Write an expression that Kyle can use to determine how many batches of pancakes he can make from a bag of flour containing any number of cups of flour.

6. Kameron grandmother gives him $20 for his birthday to put into his savings account, and his also saves his weekly allowance of $10. Write an expression that can be used to determine how much money Kameron has saved altogether for any number of weeks.

Part C: 6.EE.B.7

7. Allison is buying movie tickets for she and her friends. The price of each ticket is $8.50 and she spent a total of $42.50. Write and solve an equation determine how many movie tickets Allison purchased.

8. Lilla's water bottle has some water in it already, but she wants to completely fill it up before going to practice. She adds 21 ounces of water to completely fill the 40-ounce bottle. Write and solve an equation to determine the amount of water that was in Lilla's bottle before she completely filled the bottle.

9. Brandon's mother will allow him to spend no more than $90 on video games. Each video game costs $40. Write and solve an inequality determine how many video games Brandon is allowed to purchase.

Part D: 6.EE.B.8

10. On a 10-point grading scale, you must earn more than 59% of the available points to pass. Write an inequality that represents the minimum percentage of available points one must earn to pass.

11. Look back at problem #6 about Kameron saving money. If Kameron plans to empty his savings account prior to his next birthday, write an inequality that represents the maximum number of weeks Kameron can save money.

12. Using the number line below, represent the solutions to the inequality $x < 12\frac{1}{2}$.

Solutions

1. 47°

2. 110°

3. 45°

4. $3(2w + 2l)$ (or equivalent expression)

5. $f \div 2$ (or equivalent expression) where f is the number of cups of flour in the bag

6. $20 + 10w$ (or equivalent expression) where w represents the number of weeks

7. $8.50t = 42.50$ (or equivalent equation) where t is the number of tickets purchased; $t = 5$ which means Allison purchased 5 tickets

8. $o + 21 = 40$ (or equivalent equation) where o is the number of ounces of water in Lilla's bottle before she completely filled it; $o = 19$ which means Lilla's bottle had 19 ounces of water in it prior to completely filling the bottle

9. $40g \leq 90$ (or equivalent inequality) where g is the number of video games purchased; $g \leq 2.25$ which means Brandon can only purchase, at most, two games

10. $p > 59$

11. $w < 52$ (or equivalent statement of inequality) where w represents the number of weeks

12.
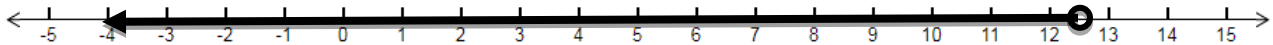
Part A Focus: 4.MD.C.7: Recognize angle measure as additive. When an angle is decomposed into non - overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real - world and mathematical problems, e.g., by using an equation with a letter for the unknown angle measure.

Why this is important for current grade level work: The standard, 7.G.B.5, requires students to have basic knowledge about supplementary, complementary, adjacent, and vertical angles. The target topic places focus on the previously mentioned subjects as well as problem solving and extending students' foundational work with expressions, equations, and rational numbers. In lessons 10 and 11, students will apply properties of equality to solve equations and model missing angle problems. This item set will help you to determine which students have the foundational knowledge of common angle measures (right angles, straight angle, etc.) as well as their understanding of adjacent and supplementary angles.	**Remediation Resources for Targeted Instruction:** 4th Grade, Module 4, Topic C, Lesson(s) 9 – 11 Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set that focus on conceptual understanding.
Using the Diagnostic Assessment to identify gaps: **Problems 1-3:** Each item in this set assesses student understanding of adjacent angles. Students are expected to know that adjacent angles are angles that share a side and vertex. They should also know that the measure of the two smaller angles can be added together to find the measure of the larger angle that the two smaller angles form. Students should understand that they must subtract or "work backwards" to find the measure of the missing angle when given the measure of the larger angle. A misconception to be mindful of is for students to believe that the angle mentioned in the question is the measure of the missing angle, rather than the sum of the two angles. In this event, students will add the measure of the two angles together rather than subtract to find the measure of the missing angle.	

Part B Focus: 6.EE.B.6: Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Why this is important for current grade level work: Before students can solve real-world problems, they must first be able to create an expression that models the rea-world situation. Moreover, students must be able to find the unknown in the situation and accurately represent it with a variable. While students have been using symbols for unknowns since Grade 1, 6th Grade was the first expectation of using a variable in its truest sense. These problems will help you identify which students have a solid understanding of a variable and which may need additional support before engaging with the target Topic.	**Remediation Resources for Targeted Instruction:**
Using the Diagnostic Assessment to identify gaps:	6th Grade, Module 4, Topic F, Lesson(s) 18 – 20

Problem 4:	**Problem 5:**	**Problem 6:**
Look for students who add 3 to each side as opposed to multiplying each side by 3 as this shows a gap in understanding the difference between additive and multiplicative comparisons. Furthermore, any equivalent expression should be accepted as a sign of readiness, but look for students who create the expressions $3 \times 2w + 3 \times 2l$ as this may show a gap in understanding of the distributive property.	Look for students who struggle to see the unknown in the problem (i.e., the number of cups in the bag of flour) and/or students who try to solve the problem by defining the number of cups in the bag of flour. Such students may have a gap in understanding variables and their purpose.	Similar to problem number 5, look for students who struggle to see the unknown in the problem (i.e., the number of weeks of saving) as this may show a gap in understanding how to use variables appropriately. Furthermore, look for students who use a variable but do not define it. While this is likely not signs of a gap in understanding, it is best practice to expect students to define variables not defined by the problem.

Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set that focus on conceptual understanding.

Part C Focus: 6.EE.B.7: Solve real-world and mathematical problems by writing and solving equations and inequalities of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers. Inequalities will include <, >, ≤, and ≥.

Why this is important for current grade level work: Students began formally creating and solving algebraic equations and inequalities in Grade 6. While limited to single-step equations and inequalities, the target Topic extends the work of Grade 6 to creating and solving two-step equations and inequalities of various forms involving all rational numbers. Having the procedural skill of solving an equation and/or inequality is not enough to serve as readiness for the target Topic as much of the Topic is connected to real-world problem solving. These items will help you determine which students can appropriately model a real-world problem with an algebraic equation/inequality as well as interpret their answer in the context of the problem. Students will build more procedural skill and fluency within the target Topic.	**Remediation Resources for Targeted Instruction:** 6th Grade, Module 4, Topic G, Lesson(s) 26 – 29 Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set that focus on conceptual understanding and/or application.

Using the Diagnostic Assessment to identify gaps:

Problems 7-8:
Take note of students who simply solve the problem without writing the actual equation. Many students experience difficulty with creating an algebraic equation to represent a real-world problem but can come up with a math strategy to find a solution to a problem; however, this will be significantly more difficult as the complexity of the problems increases in the target Topic.

Problem 9:
Look for students who struggle to connect the fractional answer to their inequality to the real-world problem they are trying to solve. Students should recognize that you cannot purchase a fractional part of a video game, requiring them to use only the whole number from their solution.

Part D Focus: 6.EE.B.8: Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Why this is important for current grade level work:			Remediation Resources for Targeted Instruction:
In lesson 12, students have to use inequality symbols to compare different quantities. Students will also have to perform operations and discuss how they impact the inequality and whether or not it will or will not "preserve the inequality symbol." The problems in this section assess students' ability to write an inequality and should prove students' readiness to move forward with subsequent work involving inequalities.			
Using the Diagnostic Assessment to identify gaps:			6th Grade, Module 4, Topic G, Lesson(s) 34
Problem 10: Look for students who connect the term *minimum* with *less than* thus creating an incorrect inequality. While academic vocabulary is of utmost importance, word associations can be dangerous and lead to misconceptions.	**Problem 11:** Look for students who do not know there are 52 weeks in a year. If a student creates a reasonable inequality using the correct inequality symbol but simply does not know there are 52 weeks in a year, the student should be considered ready for the new learning of the target Topic.	**Problem 12:** Look for students who struggle to graph $12\frac{1}{2}$, using 12 or 13 instead of the given number. As students expand their work to all rational numbers, they must be equipped to graph fractional amounts. Also, look for students who draw their graph above the line as opposed to on the line and/or use a dot instead of an open circle as both show a misunderstanding.	Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set that focus on conceptual understanding.

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