

Grade 7 Mathematics Item Specification C1 TB

Claim 1: Concepts and Procedures

Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Content Domain: **The Number System**

Target B [m]: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. (DOK 1, 2)

Tasks for this target will require students to add and subtract rational numbers, including problems that connect these operations to distance between numbers on a number line, and the concept of absolute value as it relates to distance on a number line. Other tasks will ask students to multiply and divide rational numbers and convert rational numbers to decimals.

Standards:
7.NS.A, 7.NS.A.1,
7.NS.A.2, 7.NS.A.3

7.NS.A Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

7.NS.A.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.

- Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*
- Understand $p + q$ as the number located a distance $|q|$ 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 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
- Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
- Apply properties of operations as strategies to add and subtract rational numbers.

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

- 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.
- Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with a 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.
- Apply properties of operations as strategies to multiply and divide rational numbers.
- 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.

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	7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.
Related Below-Grade and Above-Grade Standards for Purposes of Planning for Vertical Scaling: 6.NS.A, 6.NS.A.1, 6.NS.B, 6.NS.B.2, 6.NS.B.3, 6.NS.B.4, 6.NS.C, 6.NS.C.5, 6.NS.C.6, 6.NS.C.7, 6.NS.C.8 8.NS.A, 8.NS.A.1, 8.NS.A.2	<p>Related Grade 6 Standards</p> <p>6.NS.A Understand ratio concepts and use ratio reasoning to solve problems. 6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$-cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?</i></p> <p>6.NS.B Compute fluently with multi-digit numbers and find common factors and multiples. 6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm. 6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. 6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. <i>For example, express $36 + 8$ as $4(9 + 2)$.</i></p> <p>6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers. 6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. 6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite. b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate</p>

	<p>plane.</p> <p>6.NS.C.7 Understand ordering and absolute value of rational numbers.</p> <ol style="list-style-type: none"> Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. <i>For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.</i> Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C.</i> Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i> Distinguish comparisons of absolute value from statements about order. <i>For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.</i> <p>6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p> <p>Related Grade 8 Standards</p> <p>8.NS.A Know that there are numbers that are not rational, and approximate them by rational numbers.</p> <p>8.NS.A.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.</p> <p>8.NS.A.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). <i>For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.</i></p>
DOK Levels:	1, 2
Achievement Level Descriptors:	
<p>RANGE</p> <p>Achievement Level Descriptor (Range ALD)</p> <p>Target B:</p> <p>Apply and extend previous understandings of</p>	<p>Level 1 Students should be able to add, subtract, multiply, and divide nonnegative rational numbers. They should be able to add, subtract, multiply, and divide rational numbers with a number line or other manipulative.</p> <p>Level 2 Students should be able to apply and extend previous understandings and properties of addition and subtraction to add and subtract with rational numbers; identify the absolute value of a rational number and understand when opposites combine to make</p>

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operations with fractions to add, subtract, multiply, and divide rational numbers.	<p>0; and convert between familiar fractions and decimals.</p> <p>Level 3 Students should be able to solve mathematical problems using the four operations on rational numbers and convert from a fraction to a decimal. They should be able to extend previous understandings of subtraction to realize it is the same as adding the additive inverse. They should also be able to understand $p + q$ as a number located q units from p on a number line in either direction depending on the sign of q. They should also know, understand, and use the rules for multiplying and dividing signed numbers.</p> <p>Level 4 Students should be able to apply previous understandings of operations to solve real-world problems involving rational numbers with addition, multiplication, subtraction, and division.</p>
Evidence Required:	<ol style="list-style-type: none"> 1. The student interprets rational number values on a number line, including modeling addition and subtraction expressions. 2. The student applies properties of operations as strategies to add and subtract rational numbers. 3. The student applies properties of operations as strategies to multiply and divide rational numbers. 4. The student converts from a fractional form of rational numbers to a decimal form of rational numbers. 5. The student solves real-world and mathematical problems involving the four operations with rational numbers.
Allowable Response Types:	Graphing; Equation/Numeric; Multiple Choice, multiple correct response; Matching Tables; Multiple Choice, single correct response; Drag and Drop
Allowable Stimulus Materials:	number lines, positive and negative rational numbers, tables
Construct-Relevant Vocabulary:	rational numbers, absolute value, positive, negative, additive inverse, sum, difference, terminating decimal, repeating decimal, integer
Allowable Tools:	None
Target-Specific Attributes:	This target emphasizes both the understanding of operations and the ability to do calculations with rational numbers.
Non-Targeted Constructs:	
Accessibility Guidance:	<p>Item writers should consider the following Language and Visual Element/Design guidelines¹ when developing items.</p> <p>Language Key Considerations:</p> <ul style="list-style-type: none"> • Use simple, clear, and easy-to-understand language needed to assess the construct or aid in the understanding of the context • Avoid sentences with multiple clauses • Use vocabulary that is at or below grade level

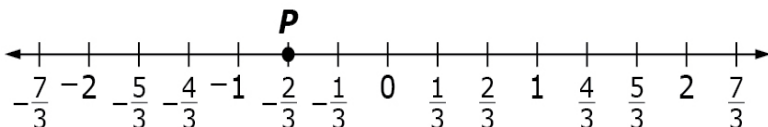
¹ For more information, refer to the General Accessibility Guidelines at:

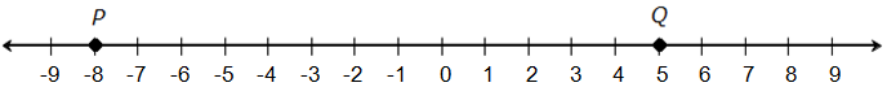
<http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/05/TaskItemSpecifications/Guidelines/AccessibilityandAccommodations/GeneralAccessibilityGuidelines.pdf>

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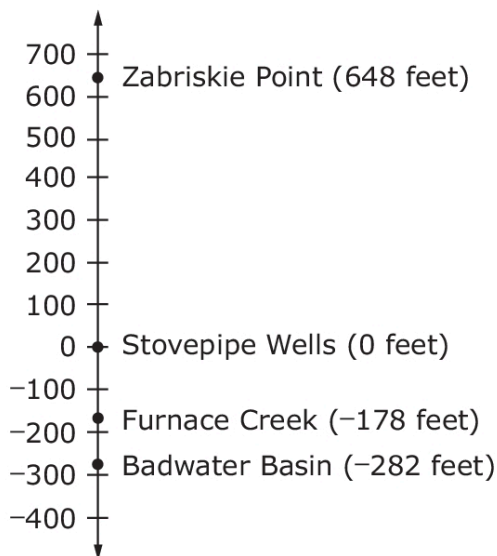
	<ul style="list-style-type: none"> Avoid ambiguous or obscure words, idioms, jargon, unusual names and references <p>Visual Elements/Design Key Considerations:</p> <ul style="list-style-type: none"> Include visual elements only if the graphic is needed to assess the construct or it aids in the understanding of the context Use the simplest graphic possible with the greatest degree of contrast, and include clear, concise labels where necessary Avoid crowding of details and graphics <p>Items are selected for a student's test according to the blueprint, which selects items based on Claims and targets, not task models. As such, careful consideration is given to making sure fully accessible items are available to cover the content of every Claim and target, even if some item formats are not fully accessible using current technology.²</p>
Development Notes:	<p>7.NS.A.2a Interpret products of rational numbers by describing real-world contexts will be addressed in Claim 2.</p> <p>Tasks for Claim 3 related to this target will incorporate student understanding of zero as a divisor, quotients of integers being rational, and termination in 0s or repeating for decimal representation of rational numbers. Tasks for Claims 2 and 4 related to this target will integrate operations with rational numbers.</p>

² For more information about student accessibility resources and policies, refer to http://www.smarterbalanced.org/wordpress/wp-content/uploads/2014/08/SmarterBalanced_Guidelines.pdf

<p>Task Model 1</p> <p>Response Type: Graphing</p> <p>DOK Level 2</p> <p>7.NS.A.1b Understand $p + q$ as the number located a distance 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 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.</p> <p>Evidence Required: 1. The student interprets rational number values on a number line, including modeling addition and subtraction expressions.</p> <p>Tools: None</p> <p>Accessibility Note: Graphing items are not currently able to be Brailled. Minimize the number of items developed to this TM.</p>	<p>Prompt Features: The student is prompted to construct a model on the number line that corresponds to given information.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> Item difficulty can be adjusted via these methods: <ul style="list-style-type: none"> Mathematical operations involving addition and subtraction are easier when the summands are positive. The majority of items written to this task model should use integers. <p>TM1a Stimulus: The student is presented with a number line with a labeled point at a rational number.</p> <p>Example Stem: What numbers are located exactly $\frac{5}{3}$ units from point P on the number line?</p> <p>Use the Add Point tool to plot the location of these numbers on the number line.</p>  <p>Interaction: Add Point and Delete tools should be provided for students to plot points on the number line containing snap-to regions at every tick mark.</p> <p>Rubric: (1 point) The student plots the exact location of both points (e.g., $-\frac{7}{3}$ and 1).</p> <p>Response Type: Graphing</p>
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<p>Task Model 1</p> <p>Response Type: Multiple Choice, multiple correct response</p> <p>DOK Level 1</p> <p>7.NS.A.1b Understand $p + q$ as the number located a distance 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 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.</p> <p>Evidence Required: 1. The student interprets rational number values on a number line, including modeling addition and subtraction expressions.</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to identify the sum or difference of rational numbers given a number line.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> All numbers should be integers. <p>TM1b Stimulus: The student is presented with a number line with two labeled points at least 3 units apart.</p> <p>Example Stem: Select all expressions that show the distance between P and Q.</p>  <p>A. $5 - (-8)$ B. $5 + -8$ C. $-8 + 5$ D. $5 + (-8)$</p> <p>Answer Choices: Answer choices should involve using absolute value signs, such as $5+8$. Distractors should include using a wrong operation, number, or sign(s).</p> <p>Rubric: (1 point) Student selects all correct expressions and no incorrect expressions (e.g., A and B).</p> <p>Response Type: Multiple Choice, multiple correct response</p>
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<p>Task Model 1</p> <p>Response Type: Multiple Choice, single correct response</p> <p>DOK Level 2</p> <p>7.NS.A.1c Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.</p> <p>Evidence Required: 1. The student interprets rational number values on a number line, including modeling addition and subtraction expressions.</p> <p>Tools: None</p> <p>Version 3 Update: Retired TM1c and TM1d and added new TM1e.</p>	<p>Prompt Features: The student is prompted to identify equivalent expressions in the form $p - q = p + (-q)$.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> All numbers should be integers. <p>TM1e Stimulus: The student is presented with an expression in the form $p - q$ and asked to identify all equivalent expressions.</p> <p>Example Stem: Select all expressions that equal $-7 - (-12)$.</p> <p>A. $7 + (-12)$ B. $-7 + (-12)$ C. $-7 + 12$ D. $7 + 12$</p> <p>Rubric: (1 point) Student selects all correct expressions and no incorrect expressions (e.g., C).</p> <p>Response Type: Multiple Choice, single correct response</p>
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<p>Task Model 2</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 1</p> <p>7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers.</p> <p>Evidence Required: 2. The student applies properties of operations as strategies to add and subtract rational numbers.</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to identify the sum or difference of rational numbers.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> Numbers can be presented on a vertical number line if more than three points with labels are graphed. Item difficulty can be adjusted via these methods: <ul style="list-style-type: none"> Mathematical operations involving addition and subtraction are easier when the summands are positive. Summands consisting of integers are easier than summands that include rational numbers such as decimals, fractions or mixed numbers. A number line containing whole number scaling is easier than one containing rational number scaling. <p>TM2a</p> <p>Stimulus: The student is presented with a problem in a real-world context involving the addition or subtraction of rational numbers written in the same form on a number line.</p> <p>Example Stem: The number line shows four elevations in Death Valley National Park.</p> <div data-bbox="725 945 1218 1497" data-label="Figure">  </div> <p>Enter the difference, in feet, between the elevation at Zabriskie Point and Furnace Creek.</p> <p>Rubric: (1 point) Correct answer will be a rational number (e.g., 826).</p> <p>Response Type: Equation/Numeric</p>
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<p>Task Model 2</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 1</p> <p>7.NS.1d 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. d. Apply properties of operations as strategies to add and subtract rational numbers.</p> <p>Evidence Required: 2. The student applies properties of operations as strategies to add and subtract rational numbers.</p> <p>Tools: None</p> <p>Version 3 Update: TM2b stimulus guidelines and example stems updated to emphasize the use of strategies and properties of operations.</p>	<p>Prompt Features: The student is prompted to apply properties of operations as strategies to add and subtract rational numbers.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • At least one of the numbers must be negative. • Items should be designed to encourage use of strategies and properties of operations. • Item difficulty can be adjusted via these methods: <ul style="list-style-type: none"> ◦ Summands consisting of integers are easier than summands that include rational numbers such as decimals, fractions or mixed numbers. <p>TM2b</p> <p>Stimulus: The student is presented with an expression involving the sum or difference of rational numbers.</p> <p>Example Stem 1: Enter the value of $14 + (-22) - 14 - 22$.</p> <p>Example Stem 2: Enter the value of $2.1 + (-3) - (-0.9)$.</p> <p>Rubric: (1 point) Student accurately computes the value of the expression, which is a rational number (e.g., -44; 0).</p> <p>Response Type: Equation/Numeric</p>
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<p>Task Model 3</p> <p>Response Type: Multiple Choice, multiple correct response</p> <p>DOK Level 1</p> <p>7.NS.A.2b Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. b. 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.</p> <p>Evidence Required: 3. The student applies properties of operations as strategies to multiply and divide rational numbers.</p> <p>Tools: None</p> <p>Version 3 Update: TM3a retired.</p>	<p>Prompt Features: The student is prompted to identify equivalent representations of fractions involving negative signs.</p> <p>TM3b Stimulus: The student is presented with an expression of the form $\frac{p}{q}$ or $-\frac{p}{q}$ where p and q are integers, and $q \neq 0$.</p> <p>Example Stem: Select all values equal to $-\frac{4}{5}$.</p> <p>A. $\frac{-4}{-5}$ B. $-\frac{-4}{-5}$ C. $\frac{-4}{5}$ D. $-\frac{-4}{5}$ E. $\frac{4}{-5}$</p> <p>Answer Choices: Answer choices are rational numbers in the form of fractions. Distractors should include incorrect values which may be of the form $\frac{-p}{-q}$, $-\frac{-p}{q}$, $-\frac{p}{-q}$, $-\frac{-p}{-q}$, $\frac{-p}{q}$, $\frac{p}{-q}$.</p> <p>Rubric: (1 point) Student selects all the correct expressions (e.g., B, C, and E).</p> <p>Response Type: Multiple Choice, multiple correct response</p>
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<p>Task Model 3</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 1</p> <p>7.NS.A.2c Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. c. Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>Evidence Required: 3. The student applies properties of operations as strategies to multiply and divide rational numbers.</p> <p>Tools: None</p> <p>Version 3 Update: Added new example stems.</p>	<p>Prompt Features: The student is prompted to determine the value of a multiplication or division expression with rational numbers. Many of these should be designed to make properties of operations a desirable strategy.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Quotients must not result in a repeating decimal. • Rational numbers may be in different forms (integer, fraction/mixed number, decimal). • Item difficulty can be adjusted via these methods: <ul style="list-style-type: none"> ○ Use integer factors and/or divisors. ○ Use fractions and/or decimals. ○ Use of parentheses in mathematical operations. <p>TM3c Stimulus: The student is presented with an expression involving products or quotients of rational numbers.</p> <p>Example Stem 1: Enter the value of $\frac{1}{2}(1.7)$.</p> <p>Example Stem 2: Enter the value of $(-8)(45)(\frac{1}{8})$.</p> <p>Example Stem 3: Enter the value of $(0.01)(-0.1)(10)(-100)$.</p> <p>Example Stem 4: Enter the value of $(0.45) \div \frac{9}{10}$.</p> <p>Rubric: (1 point) Student accurately calculates the product or quotient, which is a rational number (e.g., 0.85; -45; 1; 0.5 or equivalents).</p> <p>Response Type: Equation/Numeric</p>
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<p>Task Model 3</p> <p>Response Type: Multiple Choice, single correct response</p> <p>DOK Level 1</p> <p>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.</p> <p>Evidence Required: 3. The student applies properties of operations as strategies to multiply and divide rational numbers.</p> <p>Tools: None</p> <p>Version 3 Update: Added new TM3d.</p>	<p>Prompt Features: The student is prompted to multiply rational numbers in a real-world context.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> Item difficulty can be adjusted via these methods: <ul style="list-style-type: none"> Mathematical operations involving addition and subtraction are easier when the terms are positive. Terms consisting of integers are easier than terms which include rational numbers such as decimals, fractions or mixed numbers. Use of parentheses in mathematical operations. <p>TM3d</p> <p>Stimulus: The student is presented with a verbal description of a real-world situation with multiplication of rational numbers.</p> <p>Example Stem: If a bank represents deposits with positive numbers and withdrawals as negative numbers, what could $5 \cdot (-20)$ represent?</p> <ul style="list-style-type: none"> A. Five deposits of \$20. B. Five withdrawals of \$20. C. A \$5 deposit followed by a \$20 withdrawal D. A \$5 withdrawal followed by a \$20 deposit <p>Rubric: (1 point) The student selects the correct response (e.g., B).</p> <p>Response Type: Multiple choice, single correct response</p>
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<p>Task Model 4</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 1</p> <p>7.NS.A.2d Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. d. 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.</p> <p>Evidence Required: 4. The student converts from a fractional form of rational numbers to a decimal form of rational numbers.</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to convert a positive or negative fraction to a decimal equivalent.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Quotients must not result in a repeating decimal. • The number is given in fraction form. • Item difficulty can be adjusted via these methods: <ul style="list-style-type: none"> ○ Commonly used fractions vs. not commonly used fractions. ○ Numerator and/or denominator negative. <p>TM4</p> <p>Stimulus: The student is presented with a rational number in fraction form.</p> <p>Example Stem: Enter the decimal equivalent of $\frac{5}{8}$.</p> <p>Rubric: (1 point) Student gives the correct decimal equivalent (e.g., 0.625).</p> <p>Interaction: Make sure student cannot enter a fraction in the response space.</p> <p>Response Type: Equation/Numeric</p>
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<p>Task Model 5</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 1 (TM 5a) Level 2 (TM 5b)</p> <p>7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.</p> <p>Evidence Required: 5. The student solves real-world and mathematical problems involving the four operations with rational numbers.</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to solve real-world and mathematical problems involving the four operations with rational numbers.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Rational numbers may be in any form. • Quotients must not result in a repeating decimal. • Item difficulty can be adjusted via these methods: <ul style="list-style-type: none"> ◦ Computations with integers may be easier than computations with non-integer rational numbers such as decimals, fractions or mixed numbers. ◦ The number of differing mathematical operations increases difficulty. ◦ Use of parentheses in mathematical operations. <p>TM5a Stimulus: The student is presented with a mathematical expression involving a combination of addition/subtraction and multiplication/division with rational numbers.</p> <p>Example Stem: Enter the value of $\frac{3}{8} \left[-8 + 16 - \left(-2\frac{1}{2} \right) \right]$.</p> <p>Rubric: (1 point) Student accurately calculates the value, which is a rational number (e.g., 3.9375 or $3\frac{15}{16}$).</p> <p>Response Type: Equation/Numeric</p> <p>TM5b Stimulus: The student is presented with a one-step real-world problem involving addition, subtraction, multiplication, or division with rational numbers.</p> <p>Example Stem: Mark buys a wooden board that is $7\frac{1}{2}$ feet long. The cost of the board is \$0.50 per foot, including tax. What is the total cost, in dollars, of Mark's board?</p> <p>Rubric: (1 point) Correct answer will be a single numeric value. (e.g., 3.75).</p> <p>Response Type: Equation/Numeric</p>
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