Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.	
Content Domain: **Expressions and Equations**	
Target D [m]: Solve real-life and mathematical problems using numerical and algebraic expressions and equations. (DOK Levels 1, 2) Tasks for this target will require students to calculate with numbers in any form and convert between forms. Other tasks will require students to solve word problems leading to the equations $px + q = r$ and $p(x + q) = r$ or leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers.	
Standards: 7.EE.B, 7.EE.B.3, 7.EE.B.4	**7.EE.B Solve real-life and mathematical problems using numerical and algebraic expressions and equations.** **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 3/4 inches long in the center of a door that is 27 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 $px + q > r$ 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. Give an inequality for the number of sales you need to make, and describe the solutions.*
Related Below-Grade and Above-Grade Standards for Purposes of Planning for Vertical Scaling: 6.EE.B, 6.EE.B.5, 6.EE.B.6, 6.EE.B.7, 6.EE.B.8, 6.EE.C,	**Related Grade 6 Standards** **6.EE.B Reason about and solve one-variable equations and inequalities.** **6.EE.B.5** Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

6.EE.C.9 8.EE.C, 8.EE.C.7, 8.EE.C.8	**6.EE.B.6** Use variables to represent numbers and give 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. **6.EE.B.7** Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers. **6.EE.B.8** Give 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. **6.EE.C Represent and analyze quantitative relationships between dependent and independent variables.** **6.EE.C.9** Use variables to represent two quantities in a real-world problem that change in relationship to one another; give an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and give the equation $d = 65t$ to represent the relationship between distance and time. **Related Grade 8 Standards** **8.EE.C Analyze and solve linear equations and pairs of simultaneous linear equations.** **8.EE.C.7** Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. **8.EE.C.8** Analyze and solve pairs of simultaneous linear equations. a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6. c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the

	line through the first pair of points intersects the line through the second pair.
DOK Levels:	1, 2
Achievement Level Descriptors:	
RANGE Achievement Level Descriptor (Range ALD) Target D: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	**Level 1** Students should be able to solve multi-step problems with integers or common fractions with denominators of 2 through 10, 25, 50, or 100 and decimals to the hundredths place; solve equations in the form of $px + q = r$, where p, q, and r are integers; and distinguish between inequalities and equations with integer coefficients with or without real-world context.
	Level 2 Students should be able to solve multi-step problems with rational numbers and solve equations in the form of $px + q = r$ or $p(x + q) = r$, where p, q, and r are rational numbers. Students should be able to use variables to represent quantities in familiar real-world and mathematical situations. They should also be able to create equations with variables to solve familiar problems with a high degree of scaffolding.
	Level 3 Students should be able to solve and graph solution sets to inequalities with one variable. They should be able to use variables to represent and reason with quantities in real-world and mathematical situations with minimal scaffolding. They should also be able to construct equations with variables to solve problems.
	Level 4 Students should be able to use variables to represent and reason with quantities in real-world and mathematical situations with no scaffolding. They should be able to construct inequalities with more than one variable to solve problems.
Evidence Required:	1. The student identifies equivalency between two rational numbers. 2. The student applies properties of operations to evaluate numeric expressions, including converting between different forms of rational numbers. 3. The student solves 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. 4. The student solves word problems leading to inequalities of the form $px + q > r$ and $px + q < r$, where p, q, and r are specific rational numbers. 5. The student graphs the solution set of an inequality on a number line.
Allowable Response Types:	Multiple Choice, single correct response; Equation/Numeric; Multiple Choice, multiple correct response; Drag and Drop
Allowable Stimulus Materials:	number lines, tables
Construct-Relevant Vocabulary:	rational number, equation, numeric expression, inequality, variable, constant, solution, solution set, distributive property of multiplication over addition, commutative property of addition/multiplication, associative property of addition/multiplication, additive/multiplicative identity, additive/multiplicative inverse

Allowable Tools:	Calculator (varies by task model)
Target-Specific Attributes:	Only multi-step problems may be assessed. "Greater/less than or equal to" may be assessed.
Non-Targeted Constructs:	
Accessibility Guidance:	Item writers should consider the following Language and Visual Element/Design guidelines[1] when developing items. Language Key Considerations: • 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 • Avoid ambiguous or obscure words, idioms, jargon, unusual names and references Visual Elements/Design Key Considerations: • 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 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]
Development Notes:	None

[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

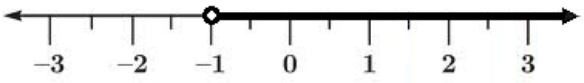
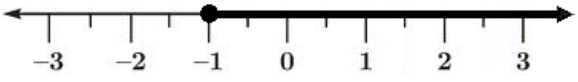
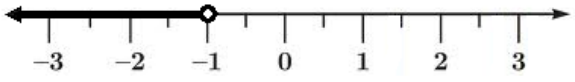
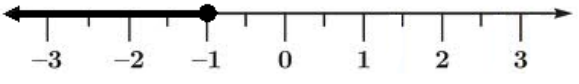
[2] For more information about student accessibility resources and policies, refer to http://www.smarterbalanced.org/wordpress/wp-content/uploads/2014/08/SmarterBalanced_Guidelines.pdf

Task Model 1 **Response Type: Multiple Choice, multiple correct response** **DOK Level 1** **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. **Evidence Required:** 1. The student identifies equivalency between two rational numbers. **Tools:** None **Version 3 Update:** Retired TM1b.	**Prompt Features:** The student is prompted to determine whether two numeric expressions are equivalent. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: o Numbers within the expressions can be integers, decimals, fractions, or mixed numbers. o The expressions may include any or all of the four arithmetic operations with or without parentheses. o Higher difficulty level problems need to include mixed numbers and the use of parentheses. **TM1a** **Stimulus:** The student is presented with a multi-step numeric expression involving rational numbers in at least two of these three forms: fraction, decimal, whole number. **Example Stem:** Select **all** expressions equivalent to $2.3 \bullet (1\frac{1}{8} + 0.125) - 9$. A. $2.3 \bullet (1.25) - 9$ B. $9 - 2.3 \bullet (1.125 + \frac{1}{8})$ C. $-9 + 2.3 \bullet (1.125 + \frac{1}{8})$ D. $2.3 \bullet (9 - 1.25)$ **Answer Choices:** Each answer choice is an expression following the same stimulus guidelines. Distractors include expressions with misapplication of properties of operations, sign mistakes, or computation errors. **Rubric:** (1 point) The student selects all the appropriate expressions (e.g., A and C). **Response Type:** Multiple Choice, multiple correct response

Task Model 2 **Response Type: Equation / Numeric** **DOK Level 1** **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. **Evidence Required:** 2. The student applies properties of operations to evaluate numeric expressions, including converting between different forms of rational numbers. **Tools:** Calculator **Version 3 Update:** Added new example stem to TM2a and revised TM2b. Now both TMs allow for calculator use.	**Prompt Features:** The student is prompted to determine the value of a numeric expression. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: o Numbers within the expressions can be integers, decimals, fractions, or mixed numbers. o The expressions may include any or all of the four arithmetic operations with or without parentheses. o Where possible use numbers that support the use of mental computation, and where using a calculator could be more challenging. **TM2a** **Stimulus:** The student is presented a multi-step numeric expression involving rational numbers in at least two of these three forms: fraction, decimal, or whole number. **Example Stem 1:** Enter the value of $2\frac{1}{4} \bullet (4 + 12)$. **Example Stem 2:** What is the mean of -15, -12, 8, and 9? **Rubric:** (1 point) The student accurately calculates the value (e.g., 36; -2.5). **Response Type:** Equation/Numeric **TM2b** **Stimulus:** The student is presented with a contextual problem that requires converting between different forms of rational numbers. **Example Stem:** Javier's fuel tank holds $12\frac{3}{4}$ gallons of gasoline when completely full. He had some gas in the tank and added 10.3 gallons of gasoline to fill it completely. How many gallons of gasoline were in the tank before Javier added some? **Rubric:** (1 point) Student enters a correct value (2.45 or equivalent). **Response Type:** Equation/Numeric

Task Model 3 **Response Type: Equation / Numeric** **DOK Level 2** **7.EE.B.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?* **Evidence Required:** 3. The student solves 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. **Tools:** Calculator	**Prompt Features:** The student is prompted to identify an equation or solution that represents a real-world problem. **Stimulus Guidelines:** • Contexts must be familiar to students 12–14 years old. • Item difficulty can be adjusted via these example methods: o Expressions have only positive rational coefficients or terms. o Expressions include negative rational coefficients or terms. **TM3** **Stimulus:** The student is presented with a real-world situation that leads to an equation of the form $px + q = r$ or $p(x + q) = r$, where p, q, and r are rational numbers. **Example Stem 1:** A coach buys a uniform and a basketball for each of the 15 players on the team. Each basketball costs $9.40. The coach spends a total of $420 for uniforms and basketballs. Enter an equation that models the situation with u, the cost of one uniform. **Example Stem 2:** A coach buys a uniform and a basketball for each of the 15 players on the team. Each basketball costs $9. The coach spends a total of $420 for uniforms and basketballs. Enter the cost, in dollars, of 1 uniform. **Rubric:** (1 point) Student enters a correct equation or value (e.g., $15u + 15 \cdot 9.4 = 420$; 19). **Response Type:** Equation/Numeric

Task Model 4 **Response Type: Equation / Numeric** **DOK Level 2** **7.EE.B.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. **Evidence Required:** 4. The student solves word problems leading to inequalities of the form $px + q > r$ and $px + q < r$, where p, q, and r are specific rational numbers. **Tools:** Calculator **Version 3 Update:** Updated stimulus guidelines to allow for non-strict inequalities and retired example stem 2 for TM4.	**Prompt Features:** The student is prompted to give an inequality that represents a real-world problem. **Stimulus Guidelines:** • Contexts must be familiar to students 12–14 years old. • CCSS Progressions clarifies that non-strict inequalities (≤ and ≥) may be used for 7.EE.B. • Item difficulty can be adjusted via these methods: o Inequalities have only positive rational coefficients or terms. o Inequalities include negative rational coefficients or terms. o Boundary value of solution set is an integer. **TM4** **Stimulus:** The student is presented with a real-world situation that leads to an inequality in the form of $px + q > r$ or $px + q < r$, where p, q, and r are rational numbers. **Example Stem:** Linda has $26. She wants to buy a ski pass for $80. She can earn $6 per hour to babysit. Enter an inequality that represents the number of hours (h) Linda could babysit to earn at least enough money to buy the ski pass. **Rubric:** (1 point) The student enters a correct inequality (e.g., $6h + 26 \geq 80$). **Response Type:** Equation/Numeric

Task Model 5 **Response Type: Multiple Choice, single correct response** **DOK Level 2** **7.EE.B.4b** 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. b. 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. **Evidence Required:** 5. The student graphs the solution set of an inequality on a number line. **Tools:** Calculator **Version 3 Update:** Updated stimulus guidelines to allow for non-strict inequalities.	**Prompt Features:** The student is prompted to identify the graph of the solution set of an inequality. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: o CCSS Progressions clarifies that non-strict inequalities (≤ and ≥) may be used for 7.EE.B. o Constants are integers; coefficient is one. o Constants are integers; boundary value of solution set is an integer. o Boundary value of solution set is a fraction/mixed number, or decimal. **TM5a** **Stimulus:** The student is presented with an inequality of the form $px + q > r$ or $px + q < r$, where p, q, and r are rational numbers. **Example Stem:** Which number line shows the solution to the inequality $-3x - 5 < -2$? A.  B.  C.  D.  **Answer Choices:** The answer choices will be horizontal lines, each showing a graph of an inequality. Distractors will include common mistakes made when graphing inequalities such as a ray pointing the wrong direction, rays with closed and/or open circles, incorrect solution to the inequality by not performing the correct operation to both sides of the inequality, and forgetting to switch the inequality symbol when dividing/multiplying by a negative number. **Rubric:** (1 point) The student selects the correct number line (e.g., A). **Response Type:** Multiple Choice, single correct response

Task Model 5

Response Type: Drag and Drop

DOK Level 2

7.EE.B.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. Give an inequality for the number of sales you need to make, and describe the solutions.*

Evidence Required:
5. The student graphs the solution set of an inequality on a number line.

Tools: Calculator

Version 3 Update:
Updated stimulus guidelines to allow for non-strict inequalities.

Accessibility Note:
Drag and Drop items are not currently able to be Brailled. Minimize the number of items developed to this TM.

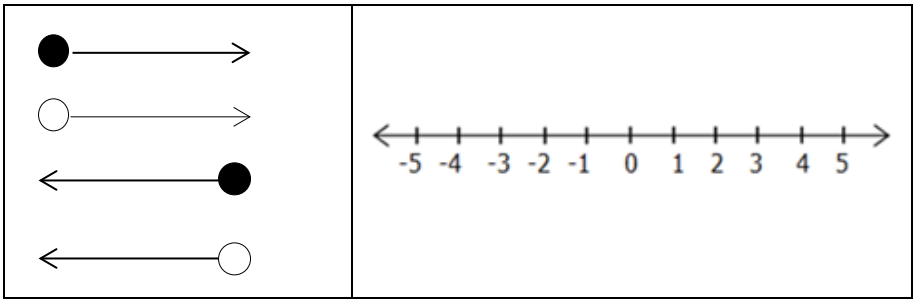
Prompt Features: The student is prompted to identify the solution set of an inequality on a number line.

Stimulus Guidelines:

- Contexts must be familiar to students 12–14 years old. CCSS Progressions clarifies that non-strict inequalities (≤ and ≥) may be used for 7.EE.B.
- Drag elements should not replace preset palette.
- Drag elements should include: closed and open circles with arrows going to the left and right directions.
- Appropriate tick marks should be spaced and labeled throughout the number line. Each tick mark should have snap regions that can fit the circles and arrows.
- Item difficulty can be adjusted via these methods:
  - Inequalities can have positive or negative rational coefficients or terms.
  - Include only strict or non-strict representations depending on the given inequality.
  - Constants are integers; boundary value of solution set can be an integer divided by a positive coefficient.
  - Boundary value of solution set can be an integer, fraction, mixed number or decimal.

TM5b
Stimulus: The student is presented with an inequality of the form $px + q > r$ or $px + q < r$, where p, q, and r are rational numbers, or a situation that can be modeled with an inequality.

Example Stem: Drag the correct arrow to the number line to represent the solution of the inequality $3x + 7 > 13$.



Interaction: The student will drag an arrow from a set of preset images to a number line to represent the solution of an inequality. Snap-to feature should be used at each tick mark.

Rubric: (1 point) The student graphs the inequality by placing an arrow on the number line.

Response Type: Drag and Drop