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 E [m]: Apply and extend previous understandings of arithmetic to algebraic expressions. (DOK 1)

Tasks for this target will ask students to write and evaluate expressions (numerical expressions with whole-number exponents; algebraic expressions; and expressions arising from formulas in real-world problems). Other tasks will ask students to identify or generate equivalent expressions using understanding of properties or operations.

Standards: 6.EE.A, 6.EE.A.1, 6.EE.A.2, 6.EE.A.3, 6.EE.A.4	**6.EE.A Apply and extend previous understandings of arithmetic to algebraic expressions.** **6.EE.A.1** Write and evaluate numerical expressions involving whole-number exponents. **6.EE.A.2** Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.* b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2(8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.* c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.* **6.EE.A.3** Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3(2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* **6.EE.A.4** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*
Related Below-Grade and Above-Grade Standards for Purposes of Planning for Vertical Scaling: 5.OA.A, 5.OA.A.1, 5.OA.A.2	**Related Grade 5 Standards** **5.OA.A Write and interpret numerical expressions.** **5.OA.A.1** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. **5.OA.A.2** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*

7.EE.A, 7.EE.A.1, 7.EE.A.2	**Related Grade 7 Standards** **7.EE.A Use properties of operations to generate equivalent expressions.** **7.EE.A.1** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. **7.EE.A.2** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*
DOK Levels:	1, 2
Achievement Level Descriptors:	
RANGE Achievement Level Descriptor (Range ALD) Target E: Apply and extend previous understandings of arithmetic to algebraic expressions.	**Level 1** Students should be able to evaluate numerical expressions without exponents; write one- or two-step numerical expressions; and identify parts of an expression, using terms (e.g., coefficient, term, sum, product, difference, quotient, factor).
	Level 2 Students should be able to evaluate numerical expressions with nonnegative integer exponents that do not need to be distributed across a set of parentheses. They should be able to apply and extend previous understandings of arithmetic to evaluate expressions with variables that do not contain exponents. They should also be able to write one- and two-step algebraic expressions that introduce a variable and identify equivalent expressions.
	Level 3 Students should be able to write and evaluate numerical expressions with nonnegative integer exponents and expressions from formulas in real-world problems, and they should be able to apply and extend previous understandings of arithmetic to evaluate expressions with variables that include nonnegative integer exponents. They should be able to apply properties of operations to generate equivalent expressions.
	Level 4 Students should be able to apply the understanding of the properties of operations and use the properties to show why two expressions are equivalent.
Evidence Required:	1. The student evaluates numerical expressions involving whole-number exponents. 2. The student writes numerical expressions involving whole-number exponents, algebraic expressions, and expressions from formulas in real-world problems. 3. The student uses mathematical terms to describe expressions. 4. The student evaluates algebraic expressions and expressions from formulas in real-world problems. 5. The student creates equivalent expressions by applying properties of operations. 6. The student identifies when expressions are equivalent by utilizing properties of operations.
Allowable Response Types:	Multiple Choice, multiple correct response; Equation/Numeric; Drag and Drop
Allowable Stimulus Materials:	

Construct-Relevant Vocabulary:	sum, product, quotient, difference, negative, term, factor, coefficient, expression, algebraic expression, numerical expression, order of operations, distributive property, associative property, commutative property
Allowable Tools:	Calculator
Target-Specific Attributes:	Only whole-number exponents can be used in items that involve the use of exponents.
Non-Targeted Constructs:	Parentheses when the student is applying the use of real-world problems or properties of operations. Distributive property of multiplication over addition. Associative property. Commutative property. Properties of addition and multiplication.
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]

[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: Equation / Numeric** **DOK Level 1** **6.EE.A.1** Write and evaluate numerical expressions involving whole-number exponents. **Evidence Required:** 1. The student evaluates numerical expressions involving whole-number exponents. **Tools:** Calculator	**Prompt Features:** The student is prompted to evaluate numerical expressions involving exponents. **Stimulus Guidelines:** • Expressions contain at least four numbers and one multiplication/division symbol. • Parentheses may be utilized to change the order of operations. • Expression should not be properly computed by simply going from left to right. • Numbers in expressions should be positive rational numbers. • Exponents should be whole numbers. • Answers should be positive numbers (up to hundredths, if a decimal). **TM1** **Stimulus:** The student is presented with a numerical expression with exponents. **Example Stem:** Enter the value of $3^3 \bullet 7^2 - 8 \div 4$. **Rubric:** (1 point) Student enters the correct value for the expression (e.g., 1321). **Response Type:** Equation/Numeric

Task Model 2 **Response Type: Equation / Numeric** **DOK Level 1** **6.EE.A.1** Write and evaluate numerical expressions involving whole-number exponents. **6.EE.A.2a** Write expressions that record operations with numbers and with letters standing for numbers. **Evidence Required:** 2. The student writes numerical expressions involving whole-number exponents, algebraic expressions, and expressions from formulas in real-world problems. **Tools:** Calculator	**Prompt Features:** The student is prompted to write an expression to represent a given verbal description of that expression. **Stimulus Guidelines:** • Expressions should be one- or two-step problems. • Exponents should be whole numbers. • Numbers in expressions should be positive rational numbers. • Item difficulty can be adjusted via these example methods: o Students write a numeric expression with exponents. o Students write an algebraic expression/formula without exponents. o Students write an algebraic expression/formula with exponents. **TM2** **Stimulus:** The student is presented with a verbal numerical expression with exponents or verbal algebraic expression with or without exponents. **Example Stem 1:** Enter a numerical expression that represents the sum of eight squared and thirty-two. **Example Stem 2:** Enter an algebraic expression that represents eight times the sum of *y* squared and twenty-eight. **Rubric:** (1 point) Student enters a correct numerical/algebraic expression for the given verbal expression (e.g., $8^2 + 32$; $8(y^2 + 28)$). **Response Type:** Equation/Numeric

Task Model 3 **Response Type: Multiple Choice, multiple correct response** **DOK Level 1** **6.EE.A.1** Write and evaluate numerical expressions involving whole-number exponents. **6.EE.A.2b** Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. **Evidence Required:** 3. The student uses mathematical terms to describe expressions. **Tools:** Calculator **Version 3 Update:** Revised the options for example stem for TM3a. Retired TM3b.	**Prompt Features:** The student is prompted to use mathematical terms to describe an expression. **Stimulus Guidelines:** • Mathematical terms include sum, term, product, factor, quotient, and coefficient. • Exponents used should be whole numbers. • Numbers in expressions should be rational numbers. • Item difficulty can be adjusted by presenting expressions that contain parentheses. **TM3a:** **Stimulus:** The student is presented with a numerical or algebraic expression. **Example Stem:** Select **all** the statements that correctly describe the expression $4^3 \bullet (8w - 7)$. A. 3 is a factor of the expression. B. The difference of 8w and 7 is a factor of the expression. C. The expression represents the product of 4^3 and $8w - 7$. D. The expression represents the difference of $4^3 \bullet 8w$ and 7. **Answer Choices:** Answer choices should be statements that include the following vocabulary: sum, term, product, factor, quotient, and coefficient. Distractors will include confusing the meaning of sum, term, product, factor, quotient, and coefficient. At least two statements must be correct. **Rubric:** (1 point) Student selects all the correct statements (e.g., B and C). **Response Type:** Multiple Choice, multiple correct response

Task Model 4 **Response Type: Equation / Numeric** **DOK Level 1** **6.EE.A.2c** Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). **Evidence Required:** 4. The student evaluates algebraic expressions and expressions from formulas in real-world problems. **Tools:** Calculator **Version 3 Update:** Added new example stem 4 to TM4.	**Prompt Features:** The student is prompted to find the value of a given expression. **Stimulus Guidelines:** • Expression cannot be properly computed by simply going from left to right. • Numbers in expressions should be rational numbers. • If used, exponents should be whole numbers. • Item difficulty can be adjusted via these example methods: o Students enter the value of an algebraic expression without fractions/decimals or exponents. o Students enter the value of an algebraic expression with exponents and no fractions/decimals. o Students enter the value of an algebraic expression that contains fractions/decimals. o Students enter the value of an algebraic expression that contains fractions/decimals and exponents. **TM4** **Stimulus:** The student is presented with an algebraic expression and specific values for variables in the expression. **Example Stem 1:** The formula $C = \frac{5}{9}(F - 32)$ is used to convert degrees Fahrenheit (F) to degrees Celsius (C). Enter the temperature, in degrees Celsius (C), equal to 113 degrees Fahrenheit (F). **Example Stem 2:** Enter the value of $2 \bullet y - 8 \div 4$ when $y = 7$. **Example Stem 3:** Enter the value of $3^3 \bullet y^2 - 8 \div 4$ when $y = 7$. **Example Stem 4:** A baker uses the expression $5.75c + 3.45p$ to calculate his profit when he sells c cakes and p pies. What is the baker's profit, in dollars, when he sells 33 cakes and 42 pies? **Rubric:** (1 point) Student enters the correct value for the expression or formula (e.g., 45; 12; 1321; 334.65). Units should be assumed from the problem. **Response Type:** Equation/Numeric

Task Model 5 **Response Type: Equation / Numeric** **DOK Level 2** **6.EE.A.3** Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3(2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* **Evidence Required:** 5. The student creates equivalent expressions by applying properties of operations. **Tools:** Calculator	**Prompt Features:** The student is prompted to create equivalent expressions based on given parameters. **Stimulus Guidelines:** • Expressions could contain one or two variables. • For expressions in the form $a(bx + cy)$, b and c do not have a common factor. • The correct answer choice will use properties of operations to generate an equivalent expression. **TM5a** **Stimulus:** The student is presented with an algebraic expression or an incomplete algebraic expression. **Example Stem 1:** Consider this expression: $3(2x + 5y)$. Enter an expression that shows the **sum of exactly two terms** that is equivalent to $3(2x + 5y)$. **Example Stem 2:** An equivalent expression to $6x + 15y$ can be written as the product of two factors. One of the factors is 3. Enter the **second factor** that will result in $6x + 15y$ when the two factors are multiplied. **Rubric:** (1 point) Student enters the correct algebraic expression (e.g., $6x + 15y$; $2x + 5y$). **Response Type:** Equation/Numeric

Task Model 5

Response Type: Drag and Drop

DOK Level 2

6.EE.A.3
Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3(2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*

Evidence Required:
5. The student creates equivalent expressions by applying properties of operations.

Tools: Calculator

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 use given parameters to create an expression that is equivalent to a given expression.

Stimulus Guidelines:

- For expressions in the form $a(bx + cy)$, b and c do not have a common factor.
- Blanks represent terms; at least two blanks should be provided.
- Expressions could contain one or two variables.
- If expressions are in the form $ax + by$, then they must have a common factor greater than one.
- Item difficulty can be adjusted via these example methods:
  - Students enter an equivalent expression that represents a given expression.
  - Students enter missing parts of an equivalent expression that represents a given expression.

TM5b
Stimulus: The student is presented with an expression and the parameters to create an equivalent expression.

Example Stem 1: Consider this equation.

$$3(2x + 5y) = \square + \square$$

Drag an expression into each box to create an expression equivalent to $3(2x + 5y)$.

Example Stem 2: Consider this equation.

$$6x + \square = 3(\square + 5)$$

Drag an expression into each box to create a true equation.

Interaction: Students will use the drag-and-drop feature to place expressions in the boxes. A palette will be given on the left-hand side with 8–12 terms. Snap-to feature should be used and Delete tool needs to be provided.

Rubric: (1 point) Student correctly creates an equivalent expression (e.g., $6x$ and $15y$; 15 and $2x$).

Response Type: Drag and Drop

Task Model 6 **Response Type: Multiple Choice, multiple correct response** **DOK Level 2** **6.EE.A.4** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions* $y + y + y$ *and* $3y$ *are equivalent because they name the same number regardless of which number* y *stands for.* **Evidence Required:** 6. The student identifies when expressions are equivalent by utilizing properties of operations. **Tools:** Calculator	**Prompt Features:** The student is prompted to identify equivalent expressions. **Stimulus Guidelines:** • If used, exponents should be whole numbers. • Item difficulty can be adjusted via these example methods: o Having multiple correct answers increases the difficulty. o Expressions can involve the distributive property or just combining or expanding terms. **TM6** **Stimulus:** The student is presented with an algebraic expression. **Example Stem 1:** Select **all** expressions that are equivalent to $4(3x + 6y)$. A. $12x + 6y$ B. $12x + 24y$ C. $2(6x + 12y)$ D. $4(12x+24y)$ **Example Stem 2:** Select **all** expressions that are equivalent to $3 + w + w + w$. A. $3(1 + w)$ B. $3 + 3w$ C. $3+w^3$ D. $3w^3$ **Answer Choices:** Answer choices will be algebraic expressions. Distractors will include confusing the meaning of sum, term, product, factor, quotient, and coefficient and/or the properties of operations. At least two expressions must be correct. **Rubric:** (1 point) Student selects all of the correct expressions (e.g., B and C; A and B). **Response Type:** Multiple Choice, multiple correct response