Claim 1: **Concepts and Procedures** Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.	
Content Domain: **Algebra**	
Target F [m]: Perform arithmetic operations on polynomials. (DOK 2) Tasks for this target will require students to add, subtract, and multiply polynomials.	
Standards: A-APR.A, A-APR.A.1	**A-APR.A Perform arithmetic operations on polynomials.** **A-APR.A.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
Related Below-Grade Standards for Purposes of Planning for Vertical Scaling: 8.EE.C, 8.EE.C.7, 8.EE.C.7a, 8.EE.C.7b	**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.
DOK Levels:	2
Achievement Levels Descriptors:	
RANGE Achievement Level Descriptors (Range ALD) Target F: Perform arithmetic operations on polynomials.	**Level 1** Students should be able to add, subtract, and multiply single variable polynomials of degree 2 or less.
	Level 2 Students should be able to add, subtract, and multiply multi-variable polynomials made up of monomials of degree 2 or less. They should understand that polynomials are closed under addition.
	Level 3 Students should be able to add, subtract, and multiply multi-variable polynomials of any degree and understand that polynomials are closed under subtraction and multiplication.
	Level 4 Students should understand and be able to explain that polynomials form a system analogous to the integers.
Evidence Required:	1. The student adds or subtracts polynomials. 2. The student multiplies polynomials.
Allowable Response Types:	Equation/Numeric; Multiple Choice, single correct response
Allowable Stimulus Materials:	Two or more polynomials
Construct-Relevant Vocabulary:	terms, factors, coefficients, monomials, binomials, trinomials, polynomials, exponents, expressions, distribute, distributive property, sum, difference, product, like terms

Allowable Tools:	None
Target-Specific Attributes:	
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 Models 1a, b **Response Types: Equation / Numeric** **Multiple Choice, single correct response** **DOK Level 2** **A-APR.A.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. **Evidence Required:** 1. The student adds or subtracts polynomials. **Tools:** None **Version 3 Update:** Expanded TM1 into TM1a and TM1b; revised the stem for TM1a; added new TM1b.	**Prompt Features:** The student is prompted to select or enter the sum or difference of two or more polynomials. **Stimulus Guidelines:** Item difficulty can be adjusted via these example methods, but are not limited to these methods: • Two or more multivariate monomials where at least two have the same variables and powers (e.g, $3x^2y + 7x^2y$), • Two or more single variable polynomials (including monomials) where all the terms are degree 2 or less (e.g., $(6x^2 + 7x) + (4x^2 - 3x)$), • Two or more multivariate polynomials (including monomials) where at least two have terms with the same variables and powers and all the terms are degree 2 or less, or • Two or more multivariate polynomials (including monomials) of any degree where at least two have terms with the same variables and powers. **TM1a** **Stimulus:** The student is presented with a polynomial expression and is required to add and/or subtract polynomials in order to write it in another form. **Example Stem:** Enter an expression that is equivalent to $(4x^2 - 5x + 6) + (9x^2 - 2x) - (11x - 3)$, combining all like terms. **Rubric:** (1 point) The student enters a correct expression (e.g., $13x^2 - 18x + 9$). **Response Type:** Equation/Numeric **TM1b** **Stimulus:** The student is presented with a polynomial expression and is required to identify the expression written in another form. **Example Stem:** Which expression is equivalent to $(mx + 5) + (2x - b)$? A. $2mx - 5b$ B. $(2 + m)x - b + 5$ C. $2mx - 5 + b$ D. $2mx - bmx + 10x - 5b$ **Rubric:** (1 point) The student selects the correct expression (B). **Response Type:** Multiple choice, single correct response

Task Models 2a, b **Response Type: Equation / Numeric** **DOK Level 2** **A-APR.A.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. **Evidence Required:** 2. The student multiplies polynomials. **Tools:** None **Version 3 Update:** Expanded TM2 into TM2a and TM2b and added new TM2c.	**Prompt Features:** The student is prompted to select or enter the product of two polynomials. **Stimulus Guidelines:** Item difficulty can be adjusted via these example methods, but are not limited to these methods: • Two or more multivariate monomials, • Two or more single variable polynomials (including monomials) where all the terms are degree 2 or less, • Two or more multivariate polynomials (including monomials) where all the terms are degree 2 or less, or • Two or more multivariate polynomials (including monomials) of any degree. **TM2a** **Stimulus:** The student is presented with an expression involving the product of polynomials and directed to respond in a specific form. **Example Stem:** Enter an expression equivalent to $(-\frac{1}{2}at) \cdot (12t^3)$ in the form A$x^m y^n$. **Rubric:** (1 point) The student enters the product in the requested form $(\text{e.g.}, -6at^4)$. **Response Type:** Equation/Numeric **TM2b** **Stimulus:** The student is presented with an expression involving the product of polynomials. **Example Stem:** Multiply and combine like terms to determine the product of these polynomials. $(2n-3)(5n+6)$ Enter your result in the response box. **Rubric:** (1 point) The student correctly multiplies and combines like terms (e.g., $10n^2 - 3n - 18$). **Response Type:** Equation/Numeric

Task Model 2c **Response Type: Multiple Choice, single correct response** **DOK Level 2** **A-APR.A.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. **Evidence Required:** 2. The student multiplies polynomials. **Tools:** None **Version 3 Update:** Expanded TM2 into TM2a and TM2b and added new TM2c.	**Prompt Features:** The student is prompted to select or enter the product of two polynomials. **Stimulus Guidelines:** Item difficulty can be adjusted via these example methods, but are not limited to these methods: • Two or more multivariate monomials, • Two or more single variable polynomials (including monomials) where all the terms are degree 2 or less, • Two or more multivariate polynomials (including monomials) where all the terms are degree 2 or less, or • Two or more multivariate polynomials (including monomials) of any degree. **TM2c** **Stimulus:** The student is presented with an expression involving the product of polynomials. **Example Stem 1:** Which expression is equivalent to $(2x - t) \cdot (3x + 5)$? A. $5x - t + 5$ B. $6x^2 - 5t$ C. $6x^2 + 7x - 5t$ D. $6x^2 + (10 - 3t)x - 5t$ **Example Stem 2:** Which expression is equivalent to $(ax + b) \cdot (cx + d)$? A. $acx^2 + bd$ B. $(a + c)x + (b + d)$ C. $(a + c)x^2 + (b + d)$ D. $acx^2 + (ad + bc)x + bd$ **Rubric:** (1 point) The student selects the correct expression (e.g., C; D). **Response Type:** Multiple choice, single correct response