MAFS.912.A-APR.1.1	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.
Item Types	Editing Task Choice – May require completing an informal argument on closure. Equation Editor – May require creating a value or an expression. GRID – May require dragging and dropping expressions/statements to complete an informal argument. Hot Text – May require dragging and dropping values/expressions to complete a polynomial. Matching Item – May require matching equivalent polynomials. Multiple Choice – May require selecting a value or an expression from a list. Multiselect – May require selecting all equivalent expressions. Open Response – May require creating a written explanation.
Clarifications	Students will relate the addition, subtraction, and multiplication of integers to the addition, subtraction, and multiplication of polynomials with integral coefficients through application of the distributive property. Students will apply their understanding of closure to adding, subtracting, and multiplying polynomials with integral coefficients. Students will add, subtract, and multiply polynomials with integral coefficients.
Assessment Limits	Items set in a real-world context should not result in a nonreal answer if the polynomial is used to solve for the unknown. In items that require addition and subtraction, polynomials are limited to monomials, binomials, and trinomials. The simplified polynomial should contain no more than six terms. Items requiring multiplication of polynomials are limited to a product of: two monomials, a monomial and a binomial, a monomial and a trinomial, two binomials, and a binomial and a trinomial.
Stimulus Attributes	Items may be set in a mathematical or real-world context. Items may use function notation.
Response Attributes	Items may require the student to write the answer in standard form. Items may require the student to recognize equivalent expressions.

	Items may require the student to rewrite expressions with negative exponents, but items must not require the student to rewrite rational expression as seen in the standard MAFS.912.A-APR.4.7.
Calculator	No

Sample Item	Item Type
	GRID –Drag and Drop

Roxanne wants to test the idea that polynomials are closed under addition. Her work and explanation are shown.

Drag an equation and phrases to the boxes to complete the statement.

Add $3x^4 - 7x^3 + 12x - 9$

to [_____].

This is closed because [_____]

of the sum are [_____] and the sum is

polynomial.

$5x^2 - (2x)^3 + (4x)^{-1}$	$(2x)^3 + 2.1x^2 - 11$

$$-8x^{-2} - (3x)^3 - 12x^6 + 7$$

the exponents	the variables	the coefficients
integers	real numbers	whole numbers